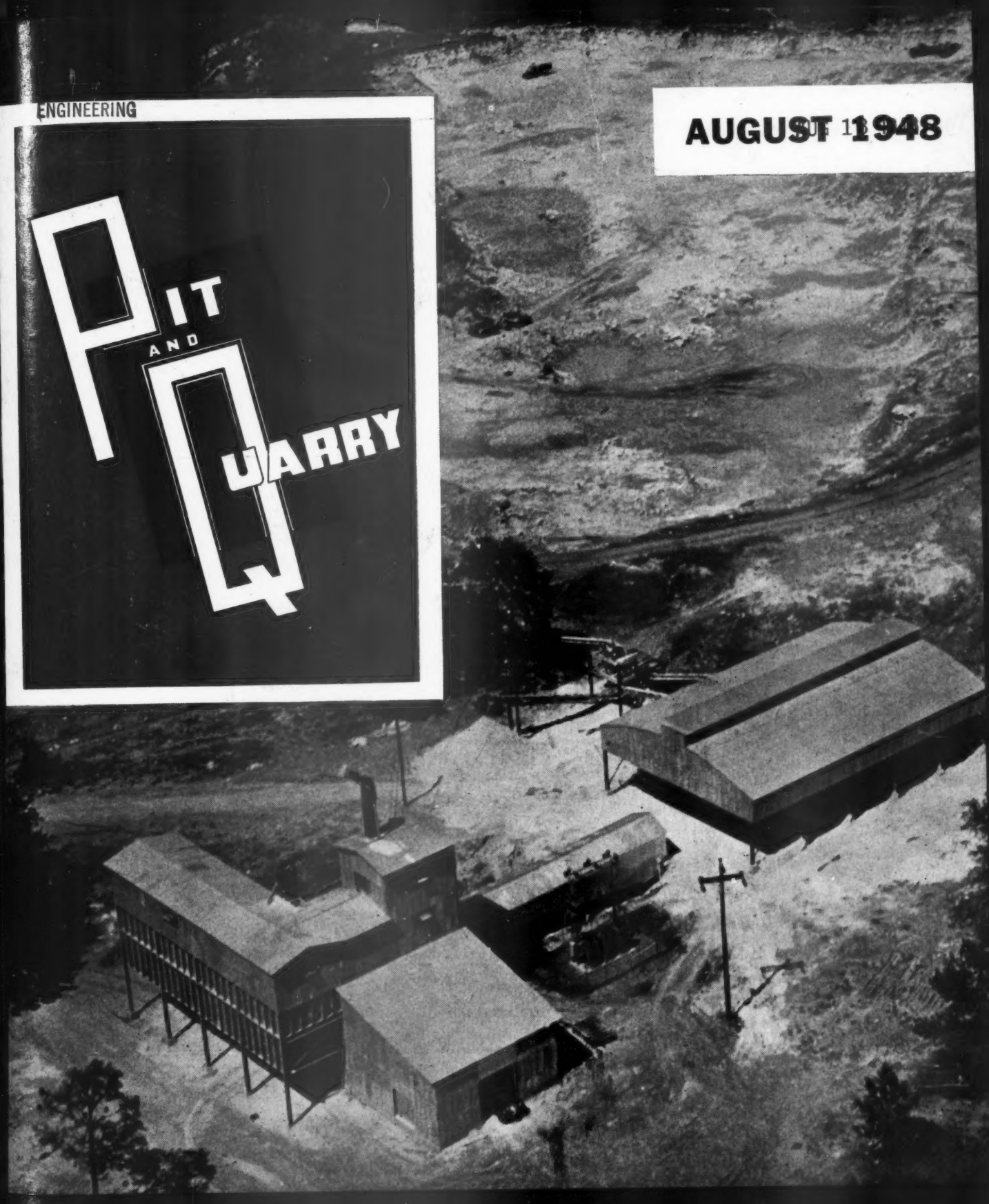
ENGINEERING

PIT AND QUARRY

AUGUST 1948



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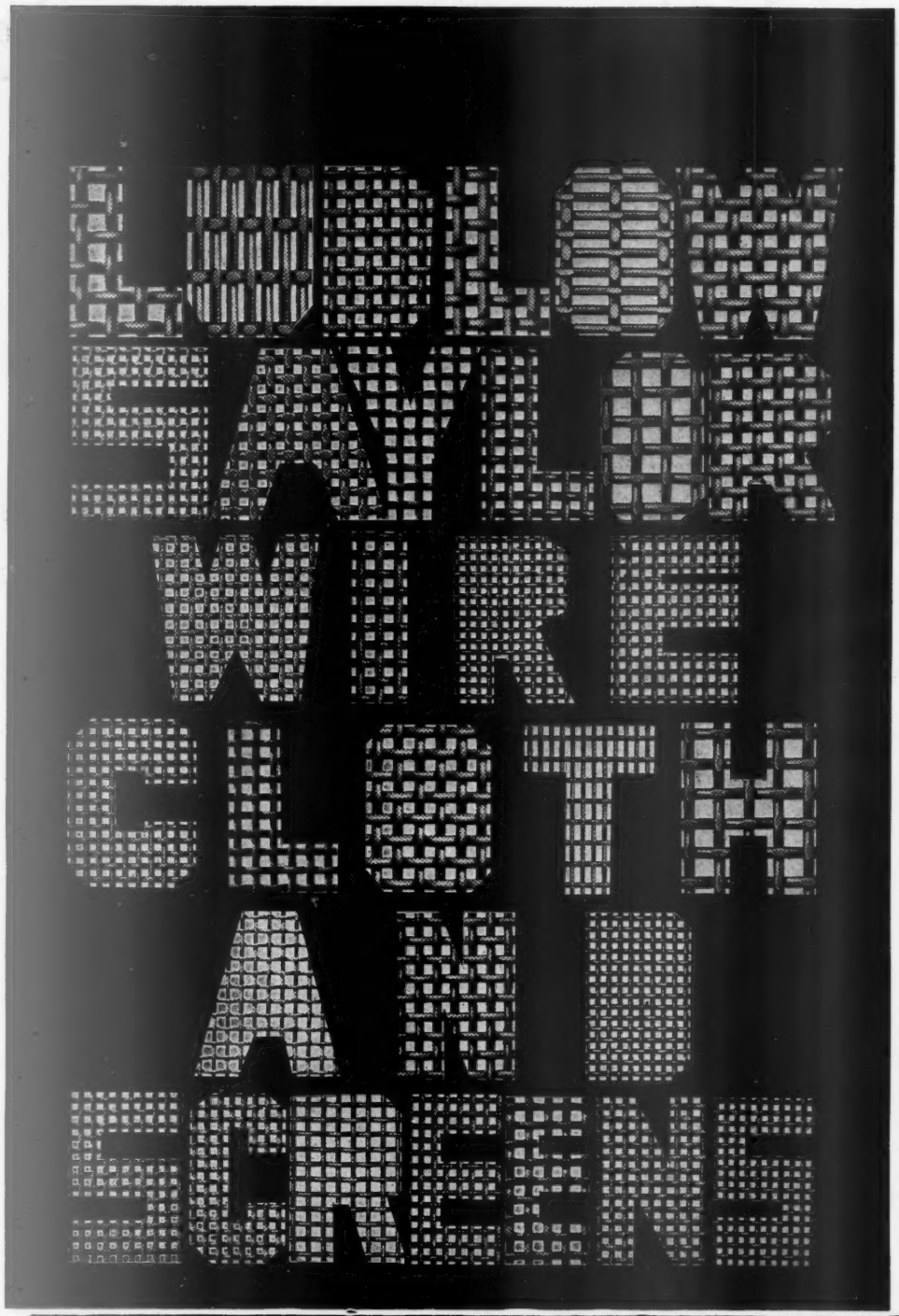

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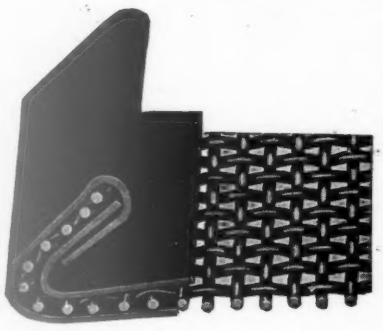

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Vol. 42 AUGUST 1948 No. 2

PIT AND QUARRY

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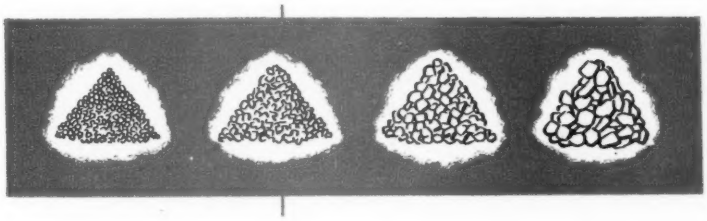

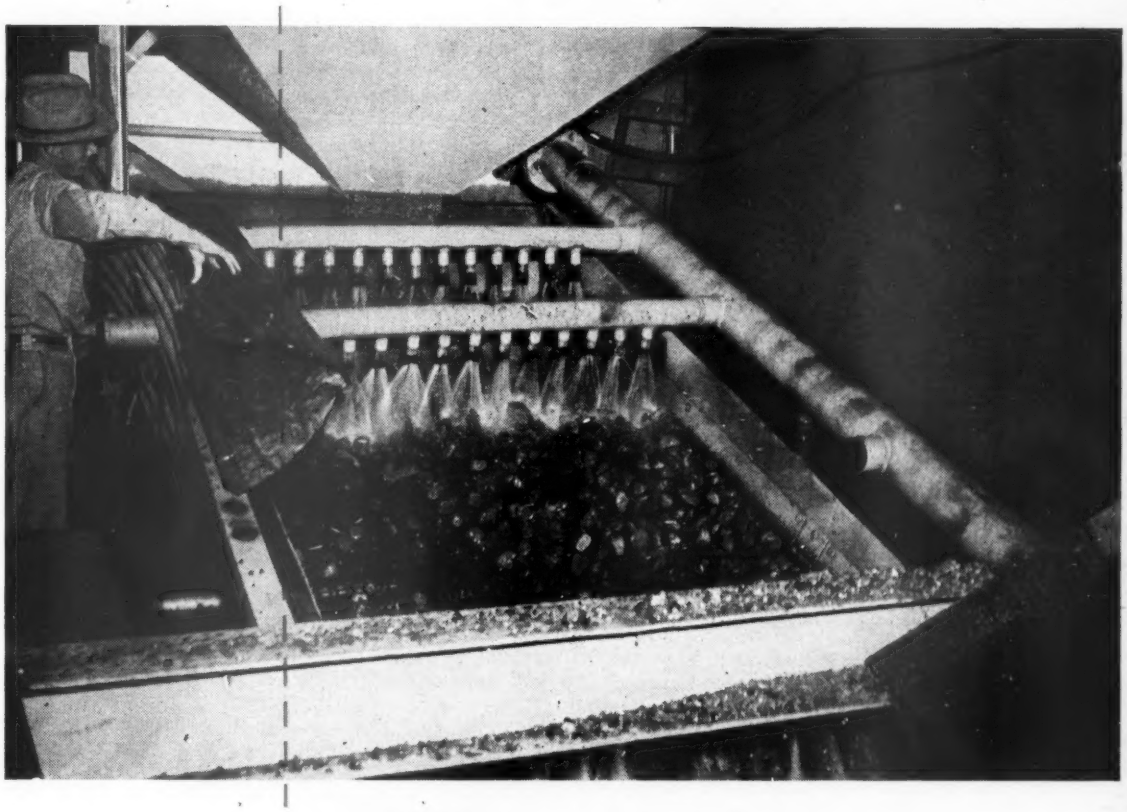

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editorial

More on the Cement Decision

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Following this action of the leading cement producers most of the larger steel producers, including the U. S. Steel Co., followed suit, holding that they had no alternative. This meant the abandonment of a pricing system which has been in existence for 50 years.

Only one major cement-producing company, the Marquette Cement Manufacturing Co., with five plants in Illinois, Iowa, Missouri, Tennessee and Kentucky, is known to be adhering to its competitive sales policy. In a letter sent on July 21 to all its customers the company emphasizes that it will continue to meet any lower price quoted by a competitor "whenever it seems good business to do so."

"In order to preserve the valuable good will of our customers in our normal marketing area, we cannot ignore the prices of our competitors," the Marquette announcement says. "It is true that today the demand for cement is so great that we could sell our entire output at almost any price, but we do not believe that this justifies requiring our customers to pay any more for our cement than their competitors pay for other brands.

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In conclusion, Marquette contends, "If a seller had to sell everyone at a plant price, regardless of differences in the laid down cost to the buyer from different sources of supply, the effect would be to freeze out competition in many areas rather than to foster it. Local monopolies would be created. Investment at many producing points would be destroyed. Labor would be forced to migrate from places where it is now employed. We believe that these considerations will prevent the elimination of competition by an enforced f.o.b. plant price method of selling."

One of the first major cement producing companies to announce the abandonment of selling methods of long standing was the Universal Atlas Cement Co., a subsidiary of the U. S. Steel Co., which operates 10 producing plants and four distributing plants in 11 states from coast to coast. In a statement issued July 1, Blaine S. Smith, president of Universal Atlas made the following statement:

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ANOTHER major cement producing company which fell in line under protest was the Lehigh Portland Cement Co. which set up a new marketing policy under which the buyer may purchase cement either at delivered or f.o.b. mill prices. The company issued a new list of f.o.b. mill prices for delivery in carload lots at each of its 14 plant locations in 11 states from coast to coast. In its announcement Lehigh said that in many sections of the country its delivered price of standard types of cement in bulk, paper and cloth remains unchanged. However, it said that there will be wide variations in some other areas with large increases and relatively small reductions taking place. In explaining its action the company said that, although there is still some doubt in legal minds about the proper interpretation of the fundamental price issues involved, Lehigh "is attempting to conform with what it considers to be both the spirit and letter of the government's mandate."

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Walter E. Trauffer

news of the industry

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Charles Boettcher, Founder Of Ideal Cement Company Dies in Denver at 96

Charles Boettcher, 96, founder and president of the Ideal Cement Co., died on July 2 in Denver, Colo. The industry will long remember with respect and homage the man who often was referred to as "the grand old man from Colorado."

In his 78 years of successful business activity, Mr. Boettcher stood out as one of the foremost figures in the cement industry. Founder of the company which he headed until his death, his achievements will stand as a monument of progress in the cement industry.

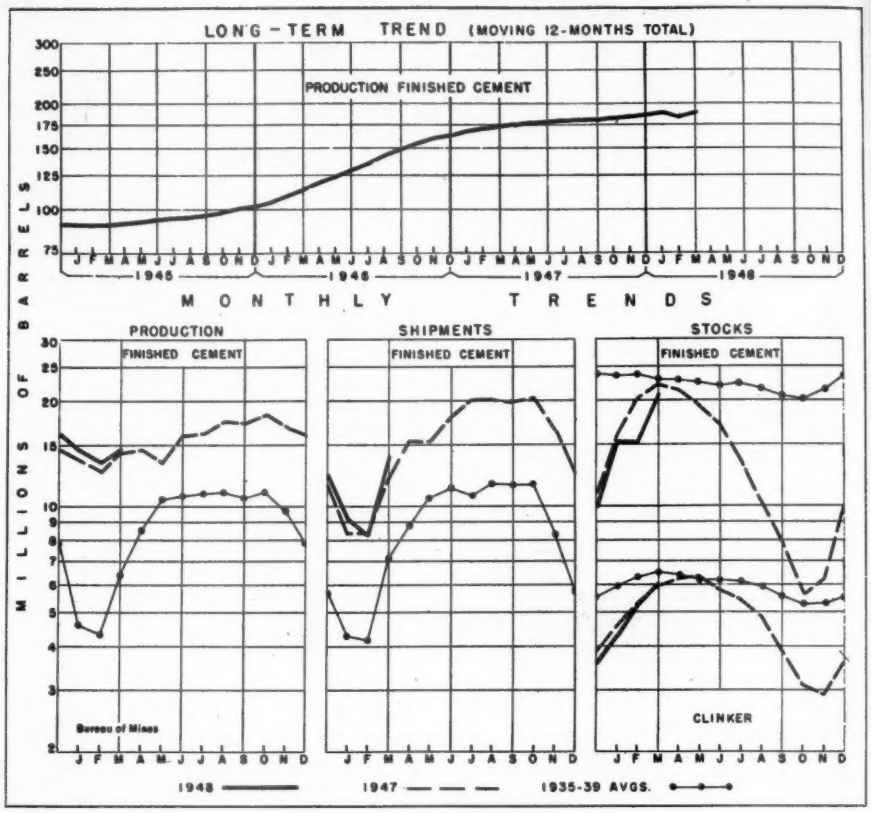
Born on April 8, 1852, in Colleda, Germany, Mr. Boettcher, after completing high school, followed his older brother to Cheyenne, Wyo., where his brother operated a hardware store. Within a few years, he struck out on his own and established a chain of hardware stores throughout northern Colorado.

On one of his frequent trips to Europe, his attention was drawn to the beet sugar business. Recognizing that the climatic conditions were similar to those of northern Colorado, he built and operated in 1900 the first sugar plant in the West. This venture, successful from the start, developed into the present Great Western Sugar Company.

The importing of cement from Europe for the construction of his sugar plant opened another avenue of exploitation for which Mr. Boettcher proved himself ready and capable. When suitable limestone beds were discovered in the banks of the Arkansas River, 26 miles east of Pueblo, Colo., he built a small plant from which has grown the present Ideal Cement Co. with eight mills in seven states, two plaster plants, and subsidiaries marketing in 22 states.

Surviving Mr. Boettcher are his widow, the former Fannie A. Cowan, his son Claude and his daughter Ruth.

Charles Boettcher



Production of 14,502,000 barrels of finished portland cement in March, 1948, reported to the Bureau of Mines, Department of the Interior, was 2 percent greater than that reported for March, 1947. Mill shipments reached 13,957,000 barrels, an increase of 15 percent above the March, 1947, figure. Stocks of 20,885,000 barrels on March 31 were 6 percent below those reported for March, 1947. Clinker output in March, 1948, reached 15,439,000 barrels, an increase of 4 percent over the corresponding month of the previous year.

Demand for cement in March, 1948, as indicated by mill shipments, followed the usual pattern of a sharp upward swing from the January and February low. With the exception of the Iowa, eastern Missouri-Minnesota-South Dakota, and western Missouri-Nebraska-Oklahoma-Arkansas districts, which show a decrease, all districts show an increase over the March, 1947, totals.

Production of portland-cement clinker and finished portland cement, and shipments of finished portland cement for the first quarter of 1948 increased, respectively, 6, 5 and 9 percent over the same quarter of 1947.

The long-term trend in production of finished portland cement, as indicated in the accompanying chart, continues upward at a low rate. Monthly production, shipments, and stock trends, compared with the previous year and the 1935-39 average, are also indicated graphically.

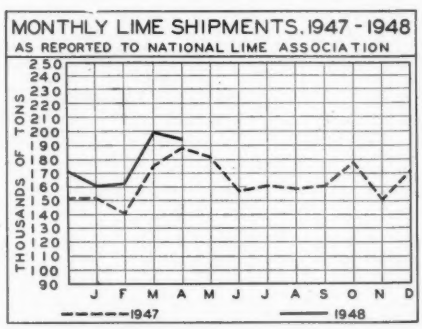
Uvalde Rock Asphalt Co. Opens New Texas Plant

The Uvalde Rock Asphalt Co., San Antonio, Tex., recently completed a new plant at Blewett, Tex., which replaces older facilities. Operation of the original plant was started in 1912 and production in the early years averaged from 20,000 to 30,000 tons a year. This year between 500,000 and 600,000 tons will be turned out for an all-time record, it is expected, on a 19-hour daily basis.

The product, a limestone containing 6 to 9 percent asphalt, is sold throughout the state of Texas for road-building, and shipment is practically all by railroad, the spur to the plant running a little over a mile to the branch lines of the Southern Pacific and Missouri Pacific.

The company owns two General Electric diesel locomotives—one 42-ton and one 65-ton. Blasting is done with a 10-in. Bucyrus-Erie drill and, working on a 75-ft. face, approximately 70,000 tons of rock are brought down at each shot.

G. H. Alvey is president and general manager, with headquarters at the main office in San Antonio.



According to data collected by the National Lime Association, 42 companies in April, 1948, shipped 194,584 tons of lime (112,912 quicklime; 81,672 hydrate). Reporting companies represent 48 percent of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 446,000 tons. Shipments by uses and grades for April, 1948, were:

	Quicklime (tons)	Hydrate (tons)
Agricultural	3,312	24,532
Building	13,960	34,025
Chemical	95,640	23,115

Universal Atlas President Announces New Sales Plan To Comply with Ruling

Blaine S. Smith, president of Universal Atlas Cement Company, made the following statement on July 1:

"Universal Atlas Cement Company is abandoning on July 7 next the method of selling cement which it has used continuously for more than 40 years, namely, sales in the markets served by it at delivered prices as low as those quoted by any competitor. This step is made necessary by the recent decision of the United States Supreme Court sustaining a Cease and Desist Order of the Federal Trade Commission against Universal Atlas and 73 other members of the cement industry. The order becomes effective on July 9, 1948. Accordingly, on July 7 Universal Atlas will adopt the method of selling cement at prices f.o.b. the shipping point, or, if the customer so desires, at delivered prices which reflect full transportation charges from shipping point to destination. Announcements will be in the hands of the trade by July 7, 1948.

"Under the selling method heretofore used, Universal Atlas frequently has been obliged, in order to meet the delivered price of a competitor located nearer to the customer, to assume a part of the cost of transportation from its shipping point to the customer's destination. This cost of competing with another cement mill more advantageously located with respect to such a customer has often been characterized as 'freight absorption.' Naturally, competing in this way with other mills results in differences in Universal Atlas' net proceeds at the shipping point depending on the amount of freight which is 'absorbed' in order to meet the delivered prices of competitors.

"Universal Atlas believes that the sales method hitherto used by it represents the fairest, most practical, and most nondiscriminatory way of marketing cement. This same method of selling is widely used in American industry as an effective means of engaging in competition and giving customers the benefit of competition between different producers. But the Supreme Court has decided that such a method can no longer be used as a regular practice.

"Although Universal Atlas holds firmly to its conviction that the order of the Federal Trade Commission is economically unsound and wrong, the law as interpreted by the Supreme Court of the United States must be respected and carried out, regardless of the grave difficulties which may thus be created for many buyers and users of cement."

Lowell B. Mason Criticizes "Cement Case" Decision

Metropolitan newspapers have given considerable publicity to a statement by Federal Trade Commissioner Lowell B. Mason, who declared that the F.T.C. has become a "czar over American business."

"Under present law," Mr. Mason said, "I guarantee that I can get a cease-and-desist order against any businessman in the country who is engaged in interstate commerce."

Mr. Mason addressed the 11th annual membership meeting of the National Small Business Men's Association.

He declared members of the F.T.C. were men of the "highest integrity," but that recent Supreme Court decisions and a faulty system had made the commission a czar.

"Present laws with regards to commerce are so confusing nobody can tell what he can or cannot do," he stated.

Third "Victory" Carries on Dravo Corp. Tradition Of Progress in Transport

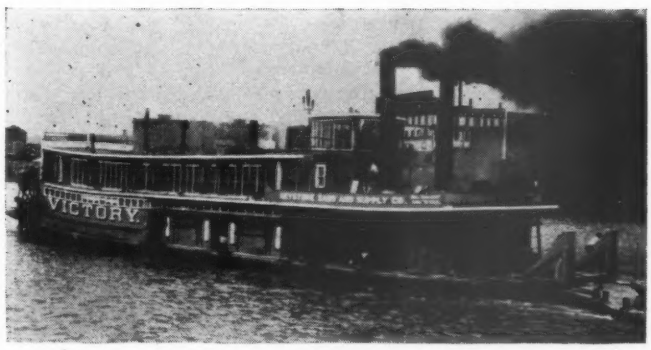
The new diesel boat *Victory* of the Keystone Sand Division, Dravo Corporation, is setting a nice pace in sand-and-gravel towing in Ohio River waters. This motor vessel is 116 by 27 by 10 ft., has 1000 hp. from twin engines. Nozzles direct the water away from the rudders and toward the propellers, thus contributing to the very remarkable thrust of 25,000 pounds at 5 m.p.h. Incidentally, this new boat illustrates well the trend of the rivers in boat construction and in river boat construction and equipment.

She is the third of the Keystone boats to be named *Victory*. The first was a 400-hp. steamer 141 by 27 by 5½ ft. in dimensions, still used on the Ohio River by her new owners, the Shearer towboat firm of Winchester, Ky. The second was a 760-hp. diesel boat 135 by 27 by 12 ft., now owned and operated by a firm in the Argentine Republic.

In other words, the trend is toward smaller and more powerful boats, in the direction of diesel power and away from steam power. The hulls of the newer boats are much deeper. In the old days, the water was shallow in the upper Ohio. Now, with locks and dams, a 9-ft. stage (often deeper) is maintained the year around.

Experience with the newest boat named *Victory* indicates it is the correct type to do a great amount of work at the lowest operating cost.

• Below, left: First "Victory," now the "O. F. Shearer." Below: Second "Victory," now working in Argentine waters. Bottom: Third "Victory."



Second Annual Convention Of Japan Cement Engineers Draws Large Attendance

The second annual convention of the Japan Cement Engineering Association was held on May 13-15 at the Japan Industrial Club in Tokyo after the meeting of the member-manufacturers division (May 12). An attendance of 295 members and visitors, including professors, engineers, government and city officials and other guests was recorded. The meeting was conducted under the chairmanship of Mitsuzo Fujii, president of the association. Following the opening address (a review of recent developments in Japan's cement industry), the executive secretary read a summary of reports on business conditions in 1947 and prospects for the next year. Several working committees have reported matters of interest, including revision of the specification for portland and other types of cement, new standard sand (natural silica sand in Toyoura), a new air-analyzer for determining the fineness of portland cement, revision of terms relating to cement and its testing, etc.

Among 39 addresses on technical subjects given by members, professors, concrete engineers and others, S. Itoh, engineer for the Japan Cement Assn., has pointed out the urgent necessity of an ample supply of high-quality coal, multiply paper bags, as well as better transportation both by land and sea in order to maintain 2-million ton cement production in 1948. K. Hashimoto, engineer of the Tokyo Industrial Research Laboratory of the Ministry of Commerce and Industry, discussed *The Relation Between Cement Formulae and Phase Equilibrium Diagrams* from the theoretical and mathematical standpoints and gave a cement formula derived from phase diagram, considering corrections for gypsum and free lime as follows: $CaO - 0.7\ SO_3$ — free $CaO = 2.8\ SiO_2 + 1.18\ Al_2O3 + 0.66\ Fe_2O_3 - 0.93\ MgO - 0.32\ Na_2O - 0.61\ K_2O$.

Many speakers discussed the alkali problem in cement and raw materials, heat balance of cement burning, burning control in cement kilns by means of the phototube-pyrometer, lightweight concrete, curing concrete in cold weather by means of electrical heating, shearing stress of concrete, etc. The address on *Some Examples of Prefabricated Reinforced Concrete Houses,* by Prof. H. Tanabe of Tokyo Technical College, gave the audience some novel ideas. He said that earthquake-proof houses may be built quickly with prefabricated reinforced concrete members, such as pillars, beams, roofs, etc., in the same manner as those with wooden members. The day ended with a dinner and refreshment and the president announced that the next convention (in May, 1949) will be held in Tokyo.

Weston Brothers Building Lime Plant at Roseburg, Ore.

A $100,000 plant for the production of commercial lime and agricultural limestone will begin operation within three months on a site ten miles south of Roseburg, Ore., according to an announcement made by C. E. and E. H. Weston.

Mineral land leases in the district include the property formerly worked by the Oregon Portland Cement Company. The plant is to have a daily capacity of 350 tons of agricultural and commercial lime.

The Weston brothers previously operated their own plant at Orofino, Ore., which will serve as a pattern for the new facilities.

New York Trap Rock Corp. Victor in Damage Suit

Mr. and Mrs. J. Freeman Dixon, who own and occupy premises in the neighborhood of the Clinton Point, N.Y., quarry operated by New York Trap Rock Corporation, brought an action against that corporation to recover for damage to their property and injuries to them which they allege were caused by the blasting at the quarry. The case was tried in April and May of 1947 before Judge George H. Taylor Jr., who, in spite of the fact that the Dixons had recovered in a somewhat similar case brought by them against New York Trap Rock Corporation some years ago, held that the blasting at the quarry did not do damage or injury, as alleged by the plaintiffs.

From the judgment entered on this finding, the plaintiffs appealed to the Appellate Division of the Supreme Court for the Second Department, where the appeal was argued last month. On June 7 the Appellate Division handed down a decision, without opinion, unanimously affirming the findings of Judge Taylor and the judgment entered thereon.

Rise in Dollar Volume of Construction Awards Continues to Increase

The dollar volume of construction contracts awarded in the 37 states east of the Rocky Mountains was sustained at a record breaking level in April, with sharp gains over March and over April of last year, an analysis made public recently by F. W. Dodge Corporation reveals.

The total of contracts awarded in the Eastern states reported last month by the Dodge field organization was $873,882,000 and represented an increase of 27 percent over March, 1948, and 45 percent over April, 1947.

The cumulative volume for the first four months of this year was $2,860,818,000. This total was 29 percent greater than that reported for the corresponding four months of last year.

Only two of the fifteen Dodge reporting regions reported a volume during the first four months less than that reported for the corresponding period of last year, these being New England, where the total was down 5 percent and southwestern Ohio and Kentucky, down 11 percent. In April, only New England reported a lesser volume than in April last year, and here the figure was down only 2 percent.

Contracts for projects classified as publicly owned constituted 27 percent of April's dollar volume, and represented 28 percent of nonresidential contracts, 2 percent of residential contracts and 82 percent of public works and utilities.

Mexican Mining Magazine Under New Management

Rolland Publications of Mexico City, publishers of *Revista Industrial,* the only industrial magazine in Mexico, and of the *First Industrial Directory of Mexico,* have announced the purchase of *The Mining Survey* of Mexico, the oldest specialized magazine in Mexico, established in 1933.

Its former owner, Paul Escalante, will continue with the magazine as advertising manager. It will be boosted from a 32-page magazine to 64 pages. It will continue to carry an English section, due mainly to the fact that there are many American miners in Mexico. This new publication will go under the name of *Revista Minera.*

• The new plant of the Lehigh Materials Company, a subsidiary of the Lehigh Navigation Coal Company, Inc. (The Old Company), at which Lelite, a lightweight aggregate will be produced. The plant is located near Tamaqua, Pa., and offices are at Lansford, Pa. This is a view of the Lelite plant taken during construction. From right to left are seen the raw materials storage system, main furnace plant, grading plant and products storage system. (See page 137 of this issue.)

Construction Work Begun On $2,000,000 P. C. A. Laboratory

The first concrete for the Portland Cement Association's new two-million-dollar research and development laboratory was placed June 30 on the site where construction is beginning in the Village of Skokie, 15 miles northwest of Chicago.

The lever which started the mechanism to allow the first cubic yard of concrete for the new structure to fall into place was released by Charles E. Aspdin of Hasbrouck Heights, N. J., the great-great-grandson of Joseph Aspdin, who invented portland cement in Leeds, England, in 1824.

Others who participated in the ceremony were Frank T. Sheets, president of the Association; W. A. Wecker, president of Marquette Cement Manufacturing Co.; S. W. Storey, president of the General Portland Cement Co. and the Consolidated Cement Corp.; and W. C. Russell, president of Peerless Cement Corp.; all are directors of the P. C. A.

The new laboratory group, consisting of two buildings joined by a covered walkway and occupying more than 98,000 square feet, is located on West Harrison Street in the northern part of Skokie. Its purpose is to replace and increase the association's present research facilities at 33 W. Grand Avenue in Chicago, with the over-all objective of intensifying scientific research to keep pace with the growing importance of concrete construction in the national postwar economy, according to Dr. A. Allan Bates, the association's vice-president.

Completion of the buildings, which are being erected by the Turner Construction Company with Carr & Wright as architects and engineers, is expected within a year. They will contain more than 25 specialized laboratories, including rooms capable of duplicating conditions of arctic cold or tropic heat with temperatures ranging from 20 deg. below zero to 130 deg. F. Equipment will include a one-million-pound compression testing machine.

Tracing the growth of the cement industry from its beginning with Joseph Aspdin's discovery that limestone and clay could be calcined to produce a stronger, more durable building material than had ever been known prior to the 19th century, W. C. Russell explained that portland cement was named by Joseph Aspdin because he thought the mortar he made from it resembled in color Portland stone quarried on the Isle of Portland off the coast of Dorsetshire in England.

"The portland cement of today bears little resemblance to Joseph Aspdin's product," he added. "It now requires more than eighty carefully and scientifically supervised steps to manufacture the cement that is the foundation of much of our modern transportation system and our building industry."

The ceremony concluded with remarks by Dr. Bates, who stressed the value of developments achieved in the present laboratory such as soil-cement, an important factor for light traffic paving, canal lining, and similar uses, and air-entraining portland cement, which makes concrete highly resistant to surface scaling and frost action.

"When the present laboratory was built in 1926, it was inconceivable that it would become inadequate in two decades," Dr. Bates declared, "but the uses of concrete have multiplied, bringing new complex problems in ever-increasing numbers. The Portland Cement Assn. has been and will be true to its trust as a clearinghouse for the solution of technical problems. It will continue to lead the way in all developments relating to concrete construction."

The new buildings will have more than three times the floor space of the present laboratories, and will contain the most modern equipment obtainable.

Although these laboratories are being built and will be maintained by funds from private industry, the work to be done will be in the public interest, Dr. Bates explained.

"Over the years, the net effect of scientific research in the uses of cement and concrete has been to improve the durability, lengthen the service life, and lower the cost of the nation's transportation facilities, firesafe buildings, water and sewage systems, and all the modern construction which makes America great," he said. "Completion of the building we have started today will put an effective tool in our hands for continued accomplishment to the same end."

• Left to right: Charles E. Aspdin, Dr. A. Allan Bates, and Arthur E. Simmons, mayor of Skokie.

Pennsylvania Stone Producers To Hold Outing on Aug. 26

Members and friends of the Pennsylvania Stone Producers Association, Inc., and its Agricultural Limestone Division are invited to attend the annual outing of the organizations, which is to be held on August 26 at the Carlisle Country Club near Harrisburg, Pa.

The officers have requested those planning to attend to make reservations promptly for the event.

• Left to right: W. A. Wecker, president of Marquette Cement Manufacturing Company; Frank T. Sheets, president of Portland Cement Association; W. C. Russell, president of Peerless Cement Corporation; Charles E. Aspdin, great great grandson of the inventor of portland cement; and S. W. Storey, president of Consolidated Cement Corporation and General Portland Cement Company.

Metallurgical Engineers Plan Three-Day October Session in St. Louis, Mo.

The Industrial Minerals Division of the American Institute of Mining and Metallurgical Engineers will hold a regional meeting at St. Louis, Mo., October 14 through 16. Headquarters will be at the Sheraton-Coronado Hotel.

The following schedule of events has been announced: October 14, visits to local plants, technical session, informal dinner; October 15, technical session, informal luncheon, technical session, divisional dinner; October 16, field conference, with visits to silica sand, barite, granite, dolomite, and limestone operations.

New Crushed Stone Plant In Operation at El Paso

An interesting new plant devoted to the production of crushed stone and bituminized aggregates has recently been put in operation in El Paso, Tex., by Hugh McMillan.

A portable Cedar Rapids plant is now being used, which will become permanent as soon as electric power is available. Two belt conveyors are operated from the primary crusher (25- by 40-in.), and two from the plant to the bins. A 10- by 36-in. jaw crusher is used for secondary reduction with 22- by 30-in. rolls. Power is furnished by Caterpillar D13 diesels. One bin of 25-cu. yd. capacity and the other 50-cu. yd. The 25-cu. yd. bin will be replaced by a 50-cu. yd. unit, and when operation is on a permanent basis production will be 150 t.p.h. All equipment is Cedar Rapids with the exception of the Caterpillar diesels.

Two 8-hour shifts with 18 men are now being used, but this force, it is expected, will be increased rapidly, as El Paso is experiencing the same tremendous demand for aggregates that exists all over the Southwest, and there is no limit to what can be sold.

The owner, Mr. McMillan, is taking a large share of the production of both the crushed stone and the asphalt plant, but surplus is sold to the general market.

W. E. Tucker is superintendent of the stone plant and H. J. Logan is superintendent of the asphalt plant.

Convention Dates Changed For N.S.G.A. and N.R.M.C.A.

After considerable difficulty in dovetailing convention dates, officials of the National Sand and Gravel Assn. and the National Ready Mixed Concrete Assn. set the time for the week of February 14, 1949, and the place, the New Yorker Hotel, New York, for this annual double feature. The National Crushed Stone Association's convention will begin on February 7. There will be no exhibits.

It was also announced that arrangements have been completed with the Hotel Stevens, Chicago, for the N.S.G.A. and N.R.M.C.A. 1950 annual convention and exhibit. This will be held the week of January 22, with the N.C.S.A. and Agricultural Limestone Institute convention and exhibit the week of January 29.

Vincent P. Ahearn Named To Two Government Posts

Vincent P. Ahearn, executive secretary of the National Sand and Gravel Association, has recently been selected for two outstanding jobs of national scope. He was appointed by President Truman to the post of executive director of the National Conference on Industrial Safety, in connection with a projected drive to cut down a toll of more than 2,000,000 industrial accidents annually. The conference, which will initiate the drive, will be sponsored by the U. S. Department of Labor in Washington, September 21 to 23.

More recently Mr. Ahearn was named industrial relations consultant in the Economic Cooperation Administration. The following outline of his service in trade association management attests to his qualifications for the appointment.

He was president of the American Trade Association Executives, 1942-43; president of the Washington Trade Association Executives, 1942-43; and chairman of the Manufacturing Trade Group National Industrial Council in 1941. He is a member of the board of trustees of the Industrial Hygiene Foundation of America. He was an industry member of the National War Labor Board, an alternate management delegate in the President's Labor Management Conference, and a management member of the Labor-Management Advisory Committee to the Director of the U.S. Conciliation Service.

Mr. Ahearn was one of two management members of the U.S. delegation to the meeting of the Building, Civil Engineering and Public Works Committee of the International Labor Organization in Brussels, Belgium, in 1946.

Vincent P. Ahearn

Expansion Program at Florida Portland Cement Boosts Plant Capacity

The plant construction program which has been under way for longer than a year at the Tampa plant of the Florida Division, General Portland Cement Co., is now nearing completion, according to Smith W. Storey, president.

It is expected that these new facilities and improvements will enable the Florida Division to produce approximately 3,000,000 barrels of various types of cements per year.

Missouri River Improvements To Benefit Sand-Gravel Firms

Indications are that the Missouri River will be the next major waterway to be canalized by the building of additional locks and dams and other river improvements. The lower river has a 6-ft. channel now. This will be deepened as far as Sioux City to 9 feet. For a long time, the river has served mainly as a drainage stream and for the loading of commercial sand and gravel. The sand-and-gravel business will not be harmed by the preparations for the navigation on this river; rather it will expand with better river boat and barge service. The Carrabine Sand & Gravel Co., Webster Grove, Mo., the Glasgow Sand Co., Glasgow, Mo., the Missouri River Sand & Gravel Co., Boonville, Mo., the Pioneer Sand Co., St. Joseph, Mo., are among firms which will benefit. Quite a number of small boats with barges have been utilized in this trade.

Western Perlite Corporation To Shift Phoenix Plant Site

Western Perlite Corp. has announced the completion of moving its Phoenix, Ariz., plant from South 14th St. to 55th St., near the Southern Pacific tracks in that city. E. E. Swift, president, said the move will give the firm an opportunity to make improvements in its machinery and afford more efficient production.

The plant now has a capacity of 40 cu. yds. of perlite per eight-hour shift. Purchased almost entirely for building work in the Salt River Valley area, the plant's product is used for concrete block, roof covering, stucco, and plaster.

Lehigh Portland Cement Averts Strike by Pay Hike

A strike of about 130 members of Local 129, United Cement, Lime & Gypsum Workers Union (A.F.L.), at the Lehigh Portland Cement Company, Alsen, N.Y., was averted when the local voted to accept a company offer of a 10-cent hourly wage increase retroactive to May 3.

William A. Hazell, state mediator, announced that the agreement completed the union's renewal of contracts with all the cement companies in the Hudson-Catskill area, with similar wage increases.

International Talc Co. Plans Big Production Hike At Hailesboro, N. Y., Plant

The International Talc Company has begun work on increasing the size of its No. 6 mill at Hailesboro, N. Y., to expand capacity substantially.

Additional crushing equipment and machinery will be added to speed up the talc grinding process. The primary purpose of the new construction is to offset some of the loss in production resulting from the recent fire which completely destroyed the No. 3 mill, also in Hailesboro.

It was disclosed that the company will institute a seven-day week at the No. 6 mill. At the present time employees work six days. The purpose of the longer week is two-fold: first to increase the company's talc output; second to employ a substantial part of the men who were formerly employed at the No. 3 mill.

U. S. Bentonite Production Sets New Record in 1947

Topping by 27 percent the 1946 all-time high, the production of bentonite rose to a new peak of 763,889 short tons, valued at $5,949,586, according to the U. S. Bureau of Mines. This tonnage was nine times the output reported in 1930 (82,593 tons). Eight states reported production during 1947, as compared with 11 states in 1946.

The major markets for bentonite, the foundry and petroleum industries, consume nine-tenths of the total tonnage. Filtering and decolorizing oils accounted for 32 percent; rotary drilling mud 31 percent; foundry sand bond 27 percent; and the remainder (10 percent) was consumed in a wide variety of other uses.

The Wyoming - South Dakota area furnished 58 percent of the total tonnage in 1947, 34 percent was produced in Wyoming, and 24 percent in South Dakota. Texas supplied 2 percent, California 1 percent, and the remainder came from Mississippi, Arizona, Montana, and Utah.

Veteran Riverman Recalls Famous Old Sand-Gravel Boats

L. W. Pierce, a riverman active in various capacities in the Pittsburgh area for the last 60 years, writes of old sand-and-gravel boats formerly widely known in trade circles.

Among those singled out for special mention were the following: the *C. Brusso* of the Builders Sand & Gravel Company, Davenport, Ia.; the *W. W. Fischer* of the Greenville Sand & Gravel Company, Greeneville, Miss., and the *Mary Jane* of the West Virginia Sand & Gravel Company, Charleston, W. Va.

Lehigh Portland Cement Co. Announces Marketing Policy

The Lehigh Portland Cement Company announced on July 13 that it had established a new marketing policy—apparently pursuant to the U.S. supreme Court's adverse decision in the recent base point case.

Lehigh will sell its products either at delivered or f.o.b. prices for delivery in carload lots. The statement indicated that delivered prices of standard types of cement in bulk paper or cloth containers will remain unchanged in many sections of the country, but that there would be wide variations in other areas.

● Proof of the increasing modernization of equipment in Mexican plants is this scene, showing a Pioneer rock crusher at Cantera El Secreto in the Pedregal, Mexico City. The crusher is powered by a "Caterpillar" diesel D1300 industrial engine. The Pedregal is an ancient lava bed from which rock is blasted and mined for street paving.

Federal-Aid Highway Act Providing $900,000,000 Passes House and Senate

During the closing days of the recently adjourned session of the Congress, the Senate and the House reconciled differences between the two houses regarding provisions of the Federal-Aid Highway Act of 1948. The compromise measure was approved and sent to the President for signature.

The Federal-Aid Highway Act of 1948 will make available to the states $450,000,000 for each of the fiscal years 1950 and 1951. Funds under the new act will be available to the states for two years after the close of the fiscal year for which they were authorized. The commissioner of public roads will begin to allocate the new funds before September 1, 1948. The bill also provides that funds remaining under the 1944 Act will be available to the states for an additional year of grace up to June 30, 1951.

Another important provision is an increase from 2½ percent to 3¾ percent in the amount to be allowed from authorized federal aid funds for administering provisions of the act and for highway research and investigational studies.

The conferees agreed to drop a Senate amendment which would have increased from the normal 50 percent to 60 percent the amount of federal aid to be given highways on the interstate system.

When the act passed the House, it called for an authorization of $500,000,000 for each of three years. The Senate amended the bill by reducing the yearly authorization to $400,000,000 and reducing its life to two years. The Senate prevailed regarding the two-year limitation, but compromised half-way with the House on the annual authorization, leaving $450,000,000 for each of the two fiscal years in question.

Sand and Gravel Traffic Heavy on Kanawha River

According to a recent check-up, the Kanawha River has been for the past few years a busy traffic lane for the improvement of sand, gravel and bulkstone. Two Parkersburg, W. Va., companies are among the leading producers and shippers who use this lane. They are the Ohio Sand and Gravel Co. and the Kanawha Sand Co. Others taking sand and gravel from the river include the following: T. G. Keeney and Sons, Diamond, W. Va.; Tri-State Materials Co.; Union Sand and Gravel Co., Huntington, W. Va.; and Harry F. White Co., Belle, W. Va.

The Southern California Rock Products Association and the Southern California Ready Mixed Concrete Association have announced a change of address for their headquarters. Offices have been moved from 835 H. W. Hellman Building in Los Angeles to 1722 North Eastern Avenue.

• With a "Caterpillar" Diesel D7 track-type tractor and a No. 70 scraper hauling the sand to the processing site, the sand and gravel plant of the Standard Lime Co., Ltd. is able to register a daily output of 2500 to 2800 tons of material at its pit near Joliette, Que., Canada. The tractor-scraper combine makes seven or eight trips an hour over the 500-ft. route, depositing 10 cubic yards of sand with each load. Work of the screening plant is done by a "Caterpillar" diesel D4600 engine, which powers the shaker screen and conveyor belt.

Plan Revival of Chemical Conference at Chicago Show

Plans for the fifth National Chemical Exposition to be held October 12 through 16 at the Coliseum in Chicago include the revival of the National Industrial Chemical Conference, which was not scheduled at the last show held in 1946.

"The conference will feature noted speakers, who will present interesting papers on new developments, discoveries and applications in industrial chemistry," said Dr. L. E. Clifcorn, chairman of the exposition committee. "Sessions will be held in the Coliseum Annex under the same roof with the show."

Announce 1947 Supplement To A.S.T.M. Standards Book

To keep up to date the triennially published Book of A.S.T.M. Standards, the American Society for Testing Materials in the intervening year issues supplements to each part of the book. The 1947 supplements, recently issued in five parts, give in their latest approved form some 330 specifications, tests, and definitions which were either issued for the first time in 1947 or revised since their appearance in the 1946 book.

The five parts are as follows: Part I-A on metals; Part I-B on nonferrous metals; Part II on nonmetallic (constructional) materials; Part III-A on nonmetallic materials such as petroleum products, lubricants, soaps, etc.; and Part III-B on nonmetallic materials such as electrical insulating materials, plastics, rubber, etc.

The section on nonmetallic materials (constructional) covers 480 pages, with some 85 standards which include the following: eight on cement and lime; four on brick, building stone, and glass; five on thermal insulation; fourteen on refractories; three on clay pipe; and five on concrete and concrete aggregates. There are six on road and paving materials and three on general tests of building and construction.

Copies of these 1947 supplements can be obtained from A.S.T.M. headquarters, 1916 Race Street, Philadelphia 3, Pa., at $4.00 per part, all five parts, $20.00. Each is bound in heavy paper cover. The five 1947 supplements, plus the 1946 *Book of Standards,* give a complete set of all A.S.T.M. specifications and tests, except those on chemical analysis of metals, which are in a special volume.

Bauxite Production Gains In First Quarter of 1948

Domestic mine production of bauxite increased slightly in the first quarter of 1948, marking the second quarterly gain since the slack demand period in the third quarter of 1947, according to the U. S. Bureau of Mines. In addition, imports of bauxite climbed to a record level, so that the net total new supply was higher than in the last quarter of 1947 by 29 percent, and was in itself a new record. Domestic output totaled 304,176 long tons (dried equivalent) in the first quarter, a gain of 2 percent over the 297,962 tons produced in the preceding quarter. Arkansas mines furnished almost 96 percent of the first quarter output.

Imports of bauxite during the quarter totaled 581,083 long tons, or 14 percent more than was received in the third quarter of 1947, the previous record period. Of this tonnage, 486,256 tons came from Surinam, 46,351 from British Guiana, 39,663 from the Netherlands Indies, and 8,813 from Brazil.

Plan Mining Machinery Display At San Francisco Exposition

A PROGRAM has been mapped out for the 1948 Metal Mining Convention and Exposition of the American Mining Congress, scheduled for San Francisco the week of September 20, covering some of the most important problems of the mining industry today, including labor relations, man power, taxes, the effect of the rearmament program and foreign aid on the mining industry, exploration and development, tariffs, stockpiling of strategic and critical materials, marginal mines, public lands, traffic problems, and many phases of mine and mill operation.

Six general sessions are planned, together with four special sessions given over to discussion of such operating problems as high-speed rock tunnel driving with modern equipment, tungsten carbide bit developments, newest methods and equipment employed in shaft sinking, conveyor haulage, factors affecting the adoption of open-pit mining, stripping with large-size and heavy-duty equipment, dredging, advances in milling practice, fine grinding, safety and hygiene, etc.

Both the general and the operating sessions of the convention will cover subjects of lively interest to producers of all types of nonmetallic minerals as well as to metal miners.

Celebrating the Golden Anniversary of the American Mining Congress and the centennial of the discovery of gold in California, all sessions of the convention, together with the exhibits of mining equipment, will be held in San Francisco's Civic Auditorium on September 20-23.

An outstanding exhibit of mining equipment is being arranged under the direction of J. J. Huether, General Electric Co., chairman of the Manufacturers Division of the American Mining Congress. This exposition will bring to San Francisco many new developments in mining machinery and supplies and will afford mining men interested in mechanization and increased operating efficiency a rare opportunity to examine and compare the latest types of equipment and to discuss their needs with engineering representatives of the manufacturers. Many mining companies are planning to send the men responsible for day-to-day performance at the mines, such as superintendents, engineers, foremen, electrical and mechanical maintenance men, mill men, etc. The exposition will be open to all persons who are interested in the mining industry. Non-exhibiting manufacturers will be admitted upon proper registration.

30 years ago in Pit and Quarry

by Walter E. Trauffer

IN the August, 1918, issue of PIT AND QUARRY, the agricultural limestone theme was carried on from the preceding issue. The editorial pointed out the opportunity for the crushed limestone producer to compensate for the loss of much of his regular business by producing ground limestone for the farmer. It was also called the patriotic duty of every quarryman to help grow two blades of wheat where one grew before. The editor mentioned the shortage of potash, most of which had come from Germany before the war, and said that one of the recognized remedies for lack of potash is a liberal application of ground limestone.

The steady growth of the agstone industry from the time production figures were first kept in 1911 was described. The year 1916 was 32 percent ahead of 1915 in volume of production and 28 percent in value. It is interesting to note that the average plant price in 1916 was $1.08 per ton, 2 cents less than in 1915.

In the second of his series of articles on *Agricultural Ground Limestone* Richard K. Meade gave some good advice on the installation of the necessary equipment, following up his analysis of the various types of equipment in the July issue. In this installment he covered the selection of equipment, storage of the product, cost of operation and commercial considerations. (We neglected to mention before that Mr. Meade, an internationally renowned chemical and industrial engineer, had been a contributing editor since the May, 1918, issue, writing exclusively for PIT AND QUARRY in this field.

Plant operations received their full share of attention in the August issue in four major articles, three of them dealing with sand and gravel production on the Ohio River. One article described the novel trestle and dump car system used by the Evansville Sand & Gravel Co., Evansville, Ind., to store its finished products. Material was obtained from the Ohio River by three suction dredges and after sizing was hauled to the shore plant in barges. A stiff-leg derrick and clamshell bucket unloaded the sand or gravel into a 20-cu. yd. hopper straddling a track on a trestle. A 2-way dump car deposited this material either into six 100-cu. yd. capacity wagon- or truck-loading bins or direct into railroad cars. Capacity was about 1,000 tons daily.

Another article described the operations of the H. H. Halliday Sand Co. at Cairo, Ill., also an Ohio River operation. This concern operated a dredge equipped with a 10-in. Morris pump and Raymond W. Dull Co. screens. Barges were towed to the shore yard, where a derrick boat unloaded the sized materials direct into railroad cars. This article included a series of photographs showing the damage done to the floating equipment and shore installations when the river ice went out late in the winter.

The third Ohio River article described the shore storage and distributing system of the Ohio River Sand Co. at Louisville, Ky. This company used two new 300-cu. yd. concrete storage silos which are still a landmark on the downtown Louisville waterfront. Sand and gravel were received in gondola cars from the company's shore plant 5 miles up the river and elevated to the silos. Details were given of the advantages accruing from the company's recent switch from wagons to motor trucks for delivery of the material.

For the first time in several issues Editor F. G. Pulley's unique artistic talent was utilized, this time to illustrate the aerial tramway and plant of the Casparis Stone Co. near Connellsville, Pa. This 150-t.p.h. Leschen tramway carried the stone 1,100 ft. from the primary crusher at the quarry to the final processing plant 500 ft. below.

In this issue also were special articles on the properties of blasting explosives, bookkeeping, methods of breaking up boulders, etc., as well as the regular news and other departments. Also described were the meetings of the newly-formed Ohio Sand & Gravel Producers' Assn. on July 9 to 11, at the Breakers Hotel, Cedar Point, O., and the reorganized National Lime Mfrs. Assn. June 19 and 20 at Cleveland.

Louisiana Increases Tax Rates on Sand and Gravel

Louisiana severance tax rates on gravel, sand and shells, together with other natural resources, were sharply increased by a bill enacted June 7 by the Louisiana Legislature and now in effect. The tax on gravel was boosted from 1½ cents per ton to 6 cents per ton; sand, from 1 cent to 4 cents; and shells from 1½ to 6 cents per ton.

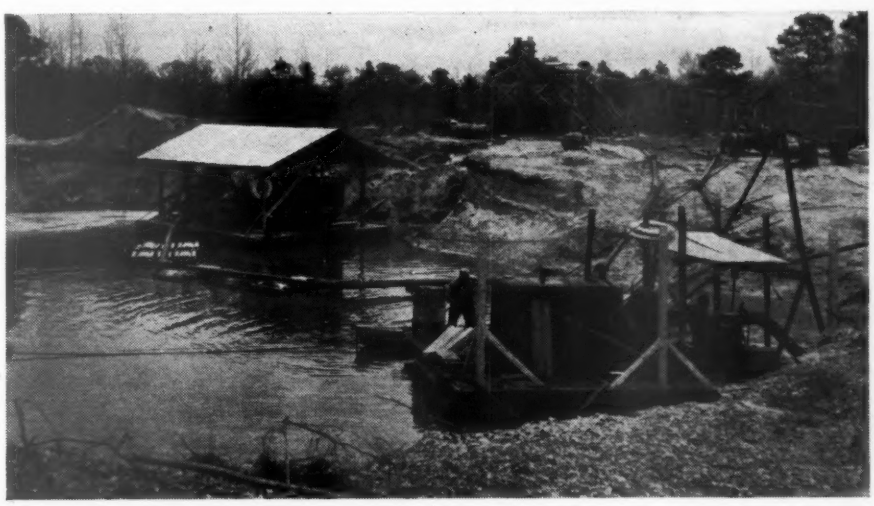
The bill was one of six measures providing for new and increased taxes enacted at the request of Gov. Earl K. Long to produce approximately $75,000,000 a year in new revenues. The gasoline tax rate was raised from 7 to 9 cents a gallon—the highest in the nation—to provide an additional $8,000,000 a year for an expanded highway construction program.

Kentucky Stone Co. Mines Yield 1,500,000 Tons Annually

Maintaining a record as one of the top producers in the limestone mining area of Kentucky, the Kentucky Stone Co. of Louisville, annually produces 1,500,000 tons of limestone from ten quarries, all located in the central part of the state.

Yellow Rock mine yields from 27,000 to 30,000 tons of stone monthly. Goodyear "Hard Rock" lug tires, especially adaptable to the rugged terrain in the mine locale, carry the trucks on short hauls between the mine, crushing plants and loading depots. Hauls per truck average 250 miles per week.

Used prominently in the hauling operations are Euclid rear-dump trucks, the high dumping angle assuring clean disposal of the limestone load. Trucks, while used mostly underground, are sometimes put into action for loading stone on freight cars when other equipment cannot handle the operation conveniently. The mines also employ use of bulldozers to pile blasted stone for loading outside the mine, and in clearing road and haulways for the truck traffic.



• Two diesel-powered dredges with centrifugal pumps produce some 700 cu. yds. of sand and gravel per day at the Baton Rouge, La., plant of the Dunham-Wilson Co. Both dredges are equipped with International diesel power units.

WASHINGTON NEWS LETTER

another P-Q exclusive

FROM the standpoint of the pit and quarry industries, one of the most important actions of the recently adjourned session of Congress occurred in its closing days, for it was then that the Senate and House reconciled their differences and the Federal-Aid Highway Act of 1948 was passed. There is little doubt that the President will sign this measure into law.

This law provides grants totalling 450 million dollars a year for the two years beginning July 1, 1949, to be distributed to states and cities if they match the federal funds dollar for dollar. A similar previous act passed in 1944 appeared to be more liberal, since it provided a billion and a half dollars to be spent or obligated over a period of three years, or 500 million dollars a year. Actually, however, it turned out that Congress provided more money than the states and cities were able to use during that period. As a result, by the end of June, 1948, when the time limit on the 1944 grant expired, some 660 million dollars were still unspent or unobligated. Fortunately, in addition to making the new grant, Congress also extended for a year the time during which the previous grant could be spent or obligated.

The reduction in the annual grant from 500 to 450 million dollars resulted from a compromise between the House and Senate versions of the bill. Actually the Senate originally wanted to provide only 400 million. In great part, this tendency to lower the amount resulted from the fact that full advantage had not been taken of the past liberality of Congress.

Many explanations were offered for the curious situation whereby most states and cities on the one hand need improved roads desperately but on the other hand fail to take advantage of a federal gift which might make their construction possible. The most frequently cited reasons are those rooted in the economics of the situation. It must be remembered that no federal money is forthcoming unless the state or city matches the amount. The first factor that made states or cities reluctant to put up their own money

By S. Herbert Unterberger

was the very high and continuously rising cost. The upward march of both labor and material costs has not yet ceased. Between 1940 and 1948, it has been estimated that the cost of highway construction has just about doubled, and it is still going up. Even were they ready to pay these high prices, very frequently the necessary materials were plainly not available. The best case in point is, of course, the steel shortage, which brought to a standstill many bridge, tunnel, and other projects.

Finally, after many years of under-maintenance during World War II, most states and cities were trying to get their own highway systems back into a reasonable state of repair. With the tremendously increased volume of traffic closing in on them, most local authorities were faced with an unhappy choice as to how they would spend their highway building dollar. They could take advantage of the available federal money and see a very expensive, federally-subsidized highway system grow while their own local roads and streets would fall into further disrepair, or they could try to return their local system to relatively good condition while falling behind in their rate of progress toward a highway system which would be able to handle the virtually certain increase in the volume of traffic. Most local administrations appear to have tried doing both with the inevitable result that full advantage was not taken of either possibility. For the federal program, this meant that approximately 660 million dollars was not utilized.

Industries concerned with highway construction can count themselves fortunate that Congress did not, in this case, follow its frequent behavior of recapturing the unexpected balance, but rather extended the privilege of obligating this amount for another year. Around Washington there is a well known saying about appropriations that "if you don't spend them, you lose them." The action of Congress in connection with this grant is a violation of that rule.

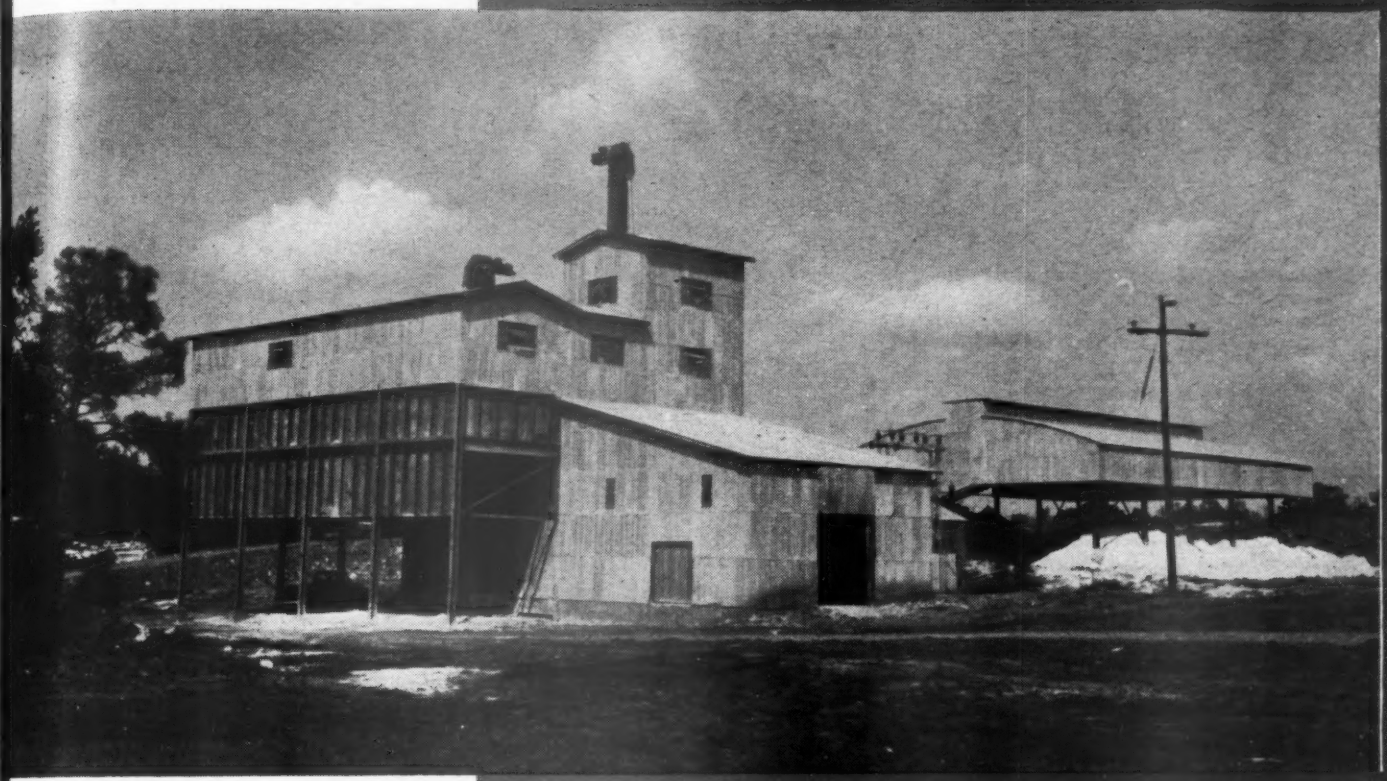
As a matter of fact, for the coming fiscal year there may be more federal money available for highways than there was in the past or will be in the future. For the three years preceding July 1, 1948, there was 500 million dollars available each year. Actually an average of only 280 million dollars a year was spent or obligated during that period. From July 1, 1948, through June 30, 1949, a total of 660 million dollars will be available. In addition, before September 1, 1948, the Commissioner of Public Roads will allocate funds out of the subsequent authorizations, even though those additional funds can not actually be paid out until after July 1, 1949. Beginning July 1, 1949, only 450 million dollars a year will be available for a two-year period. If only the states and cities take advantage of the opportunity, the coming fiscal year can become the greatest ever for the highway construction industry.

Of interest also in connection with this legislation is the increased allowance for administration of the act and for highway research and investigational studies. Formerly, only 2½ percent of the amount was available. The new act has raised this to 3¾ percent.

* * *

Since most of the units in the pit and quarry industries are themselves small businesses, they will, no doubt, be interested in the recent legislative recognition given to "small business." Sandwiched in among the many other provisions of the recently-enacted Selective Service Act of 1948, one finds the interesting provision that "Under any such program of national procurement, the President shall recognize the valid claim of American small business to participate in such contracts, in such manufactures, and in such distribution of materials, and small business shall be granted a fair share of the orders placed, exclusively for the use of the armed forces or for other Federal agencies. . . ." Coupled with a later provision that steel producers are required to make steel available to other businesses which have orders for materials required by the armed forces, it looks as though Congress may have done something effective toward preventing a repetition of the wartime situation in which small business hardly got a "look-in" when it came to war orders.

• A general view of the new plant of the Armena Lime Mine & Farms, Inc., Albany, Ga., showing bins and the pulverizing building in the foreground, the drying shed at the far right. For an aerial view showing the quarry, see the cover of this issue.



Versatile AGSTONE PLANT

Shemwell's Layout Features Continuity And Easy Switch To Alternate Products

By WILLIAM M. AVERY

• Left to right: E. R. Culbertson, Dermot Shemwell Sr., Dermot Shemwell Jr. and H. T. Fulton.

another ON THE SPOT report

AN exceptionally efficient and well designed agricultural limestone plant was recently placed in operation near Albany, Ga., by Armena Lime Mine & Farms, Inc. Since there are still relatively few establishments in the country specifically designed for the production of agstone, the plant itself has more than ordinary interest for those of our readers who are engaged in, or who contemplate engaging in, the agricultural limestone business. Of at least equal interest, however, is the story behind the plant—a story involving such apparently disparate elements as a prosperous farm enterprise, horse raising, and a serious statewide shortage of badly needed liming materials.

● Above, left: The primary screening station is located between the crusher and the drying shed. The product is normally split here into plus and minus 1-in. fractions. Two conveyors at the right feed the drying shed.

● Above, right: The quarry truck dumping to the knob-roll primary crusher. Capacity at this point is 200 t.p.h. Excess was provided in order to feed material into the drying shed more rapidly than the plant could take it out.

● Right: A view in the drying shed, showing how the stone is fed to the tunnel gates. The building is 60 by 90 ft. Sides are open to a point 18 ft. above grade.

A U. S. Department of Agriculture report published several years ago disclosed that almost 12,000,000 acres of cropland and pasture land in the state of Georgia urgently required applications of agricultural limestone. The total requirements were computed to be in excess of 16,500,000 tons, and the annual need, based on one-tenth of the total for initial application plus maintenance at the rate of two-tenths of a ton per acre, was placed at slightly over 4,000,000 tons. Against this need, the report pointed out, the total annual capacity of the industry in Georgia was less than 400,000 tons.

Dermot Shemwell & Sons, which was later to become Armena Lime Mine & Farms, Inc., operate a prosperous 1,500-acre plantation about 10 miles west of Albany, Ga. They specialize in raising high-grade beef cattle, and in raising and training Tennessee walking horses. The property included a 200-acre deposit of high-grade limestone. As scientific planters the Shemwells recognized the importance of liming, and in the complete absence of local commercial production they undertook to produce from their own deposit sufficient material for their immediate needs. A quarry was opened in 1939, and the stone was moved in wheelbarrows from the face to the small mill in which it was pulverized.

Neighboring farmers, who watched closely the results of the lime applications on the Shemwell pastures, soon began clamoring for an opportunity to try the material on their own fields. Production was increased, some labor-saving machinery was installed, and in a rather short time the Shemwells found themselves engaged in the commercial production of agricultural limestone. By 1945 their plant, which was largely self-engineered, was producing up to 25 tons per hour, and operations were maintained on a year-round basis.

This plant, which was described in considerable detail in the May, 1945, issue of PIT AND QUARRY, had several inherent faults. Perhaps the most serious one was its complete dependence upon quarry operations. When wet weather halted proceedings in the quarry, the plant, having no raw stone storage capacity, had to shut down immediately. Even under the best conditions the company's shipments ran close to 1,000 tons per month behind orders, and in bad-weather years the deficit soared as high as 20,000 tons.

The correction of this difficulty was considered a prime objective in connection with the design of a new plant. E. Lee Heidenreich Jr., consulting engineer, was retained to lay out and design the new facilities, and construction work began early in 1947. The location selected was a hillside west of the existing quarry pit. New equipment was used throughout the entire project.

The 200 acres of verified mineral lands contain upwards of 22,000,000 tons of limestone in alternate strata of hard and soft material. An average of 4 ft. of sand and clay overburden must be stripped to reach the stone. This is accom-

plished with an International TD-18 tractor and a 6-cu. yd. Le Tourneau scraper pan. The quarry is at present being worked on a 20-ft. face, and all drilling is done with hand-operated sinker drills. Wagon drills were tried and abandoned when it was found that the softness of the stone caused frequent loss of holes. Forty percent dynamite with electric caps is used in blasting, and up to 30 holes in 2 or 3 lines are shot at one time. In an average shot up to 300 tons of the relatively soft limestone is brought down. Explosives cost an average of 4 cents per ton.

Loading is done with a Bucyrus-Erie Dozer Shovel mounted on an International TD-9 tractor. Five-yard Ford dump trucks make the 1,000-ft. haul from the present working face to the primary crusher, which is fed from a truck hopper by a 36- by 72-in. Syntron vibrating feeder. The crusher is a 24- by 60-in. single-roll Maddox unit driven by a 75-hp. Westinghouse motor. It reduces the stone down to 4 in. and discharges onto a 24-in. inclined belt conveyor which feeds the primary screening station. All the conveyors in the plant were supplied by Continental Gin, and are equipped with Goodrich belts. All incorporate American No. 4 speed reducers mounted on the head shafts.

The screening station is located about midway between the primary crusher and the raw storage warehouse. Here a 48- by 102-in. single Robbins Vibrex screen mounted on a structural steel tower can be used either to separate the flow into two size fractions, or to screen off plus ⅝ in. stone for use as road material. In a letter written since we visited the plant, Dermot Shemwell Jr. advised us that the latter practice had been adopted in order to take care of orders for several thousand tons of road stone. This material, ranging up to 2½ in., is stockpiled by a short belt conveyor leading out from the side of the screening tower.

Since the introduction of highway stone into the picture, minus ⅝ in. stone and the plus 2½-in. stone are sent to the storage shed. Two conveyors, one 24 in. and the other 18 in. wide, connect the screening tower with the shed, and the normal practice will be to use these to separately convey and store plus 1-in. stone and minus 1-in. stone. This separation is made primarily to speed drying, since the coarse fraction will dry much faster than the finer material.

The storage shed is a 60- by 90-ft. structural steel frame building, open on all four sides to expedite drying. It will accommodate up to 6,000 tons of raw stone, or enough to keep the plant in operation for a week or more when wet weather shuts down the quarry. With this surge capacity it is felt that production can be maintained on a practically continuous basis, since rainy spells seldom last for as long as a week in this section of Georgia. Under normal conditions the balance of the plant is such that one 8-hr. shift in the quarry will produce sufficient stone for two 8-hr. shifts in the pulverizing plant. Whenever the surge capacity drops below a safe level, additional hours will be worked in the quarry to refill the storage shed.

• Above, left: Finished products are distributed to the various bins by means of these screw conveyors.

• Above, right: The vibrating feeders in the tunnel roof assure uniform flow of stone onto the belt conveyors.

• Left: The product of No. 2 pulverizer is elevated and passed over this 4- by 10-ft. triple-deck vibrating screen.

• Inclined conveyors from the tunnel under the shed are enclosed. The belts are 18 and 24 in. wide.

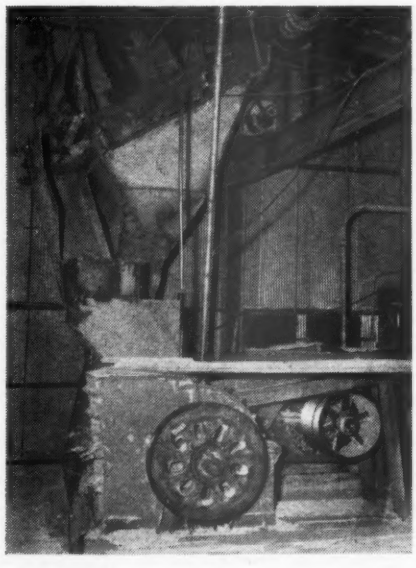
The two sizes of stone are stored on opposite sides of the shed. The original design incorporated 12-in. and 16-in. screw conveyors for distributing the stone over the recovery tunnel, located below the floor of the shed, but these have been removed and the conveyors now discharge directly onto the floor. It is thus necessary to do some trimming on the piles in order to utilize the entire storage area. One of three Dozer Shovels operated in the plant is used for this purpose, and also (when necessary) for shoving stone to the tunnel gates.

The 14-ft.-wide tunnel houses two belt conveyors which feed the pulverizing plant—a 24-in. belt on one side for feeding plus 1-in. stone, and an 18-in. on the opposite side for minus 1-in. stone. Three of the five gates in the tunnel roof are located over the 24-in. conveyor, and all five are equipped with 18- by 42-in. Syntron vibrating feeders to regulate the rate of flow.

Pulverizing is done with two No. 3 Universal heavy-duty hammermills, each driven by a 150-hp. G. E. motor. One is equipped with 3/16-in. spacer bars in order to reduce the entire flow to agricultural limestone and fertilizer filler. Minus 3/16-in. stone is removed ahead of this mill on a 4- by 5-ft. Type 37 single-deck Tyler-Hum-Mer screen, and rejoins the flow on the discharge side of the mill. The entire product is then elevated to the top of the building and discharged into a 14-in. Link-Belt screw conveyor which distributes it into four 200-ton steel storage bins.

By changing grate bars the No. 2 mill can be used for making agstone or any of several products which the company plans to produce eventually. It receives plus 1-in. stone from the storage shed without any intermediate screening, and its product is elevated and discharged onto a triple-deck, 4- by 10-ft. Bonded Scale vibrating screen located at the top of the plant. In addition to agstone, various sizes of chicken grits and concrete block aggregates may be sized out on this screen, which has a closed circuit return to the mill for oversize material. At present this unit is equipped with ¾-in. screen on the top deck, ½-in. on the middle deck, and 3/16-in. on the bottom. Stone retained on the middle deck is currently being marketed as driveway aggregate, and considerable quantities are being sold for parking lots, used-car lots and drive-in restaurants. This material and the plus 3/16-in. stone flow down a gravity chute into the No. 1 storage bin, which has been divided into two compartments. The 3/16-in. product goes entirely to concrete block producers. Fines are distributed among the three remaining bins by means of a screw conveyor. It is planned to install a small bagging plant in the building for chicken grits, and a 14-ft. air separator is also in prospect for recovering mineral dust.

• The screen ahead of the No. 1 pulverizer bypasses minus 3/16-in. stone. Another identical pulverizer receives plus 1-in. stone directly from the shed without prior screening.



With both mills producing agstone the new Armena plant is capable of turning out 70 to 80 t.p.h. of a product that tests 90 percent minus 10-mesh and 50 percent through 60-mesh. Analysis of the rock, which is a white crystalline Vicksburg limestone, shows a calcium carbonate content of over 98 percent and a bare trace of magnesium carbonate. Since silica runs one percent or less, the material is entirely suitable for use as mineral feed and chicken grits. It is anticipated that output of filler and feed will range from 25 to 50 tons per 8-hr. day, and that poultry grits will vary from 10 to 30 tons per day, depending on demand and other factors.

Finished product storage facilities for the plant are arranged for convenient loading into trucks or railway cars. The company will make agstone deliveries in a 3-county area with its own fleet of six Baughman spreaders, but it is thought the bulk of shipments (at least 75 percent) will move by rail. Each of the bins has three 18- by 18-in. discharge gates through which material can be loaded into either trucks or cars. Now under construction is a 10-car storage track under the storage bins at the plant. The Seaboard Railroad will provide switching service.

With a potential market still far in excess of plant capacity, it seems certain that the Armena property will operate at full 2-shift capacity for many years to come. This prospect is fortunately backed up by tremendous reserves of limestone, some 22,000,000 tons of which is available at a working depth of 33 ft. The owners' primary interest is in agstone production, but the utmost flexibility has been incorporated in the design to assure continuous profitable operations on other products if the agstone market should falter. In addition to the provisions already mentioned, the design of the plant anticipates the

(*Continued on page* 90)

Pacific Building Materials Plant Hits 200-Ton-per-Hour Output

another ON THE SPOT report

ONE of the newest and most up-to-date of the aggregates-producing operations in the Pacific Northwest is the 200-ton-per-hour plant of the Pacific Building Materials Co. at Portland, Ore.

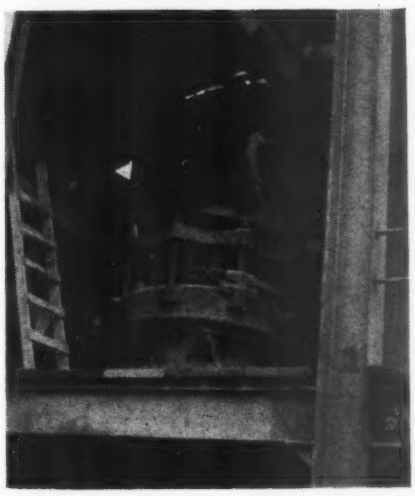
The plant is situated on the Willamette River at the foot of Curry St.,

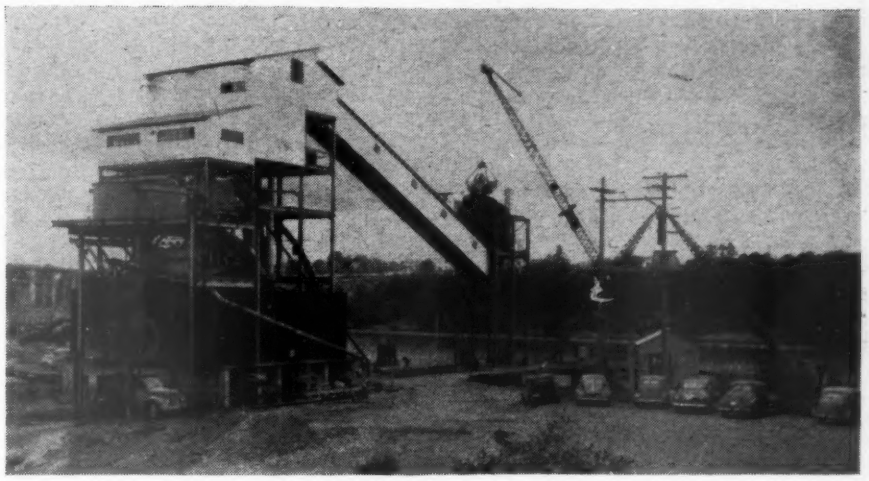
By HARRY F. UTLEY

having been erected alongside an old plant which had only about one-fourth the capacity of the new. The old plant ceased production, after 14 years in service, when the new processing plant went into operation in June, 1947. An outstanding feature of the new unit is its utilization of relatively elaborate equipment to reclaim every last particle of usable fines.

Raw material is excavated from the Willamette River by two bucket dredges which usually work upstream from the plant. The loaded scows, carrying about 300 tons, are towed to the plant dock. Here, a Washington Iron Works stiff-leg derrick, equipped with a 120-ft. boom and a 3-cu.-yd. Owens clamshell bucket unloads the river-run material, discharging to a steel hopper 65 feet above ground level. A sloping grizzly, with bars spaced 3½ inches apart, rejects the boulders which pass to a 10- by 24-in. Lippmann jaw crusher set at about 1 inch. The grizzly troughs go into the hopper and are fed by pan feeder, along with the product of the crusher, to a 30-in. by 130-ft. inclined belt conveyor which runs up to the top of the plant proper.

The conveyor discharges to a Seco





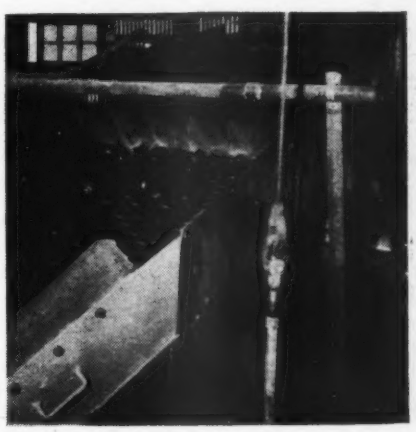
• The new plant of the Pacific Building Materials Company on the Willamette River in Portland, Ore.

4- by 10-ft. triple-deck screen equipped with washing sprays, which makes the initial separation, scalping off the 2½-, 1½-, and 1-in. material for further reduction or, at option, chuting it into the bins below. Minus 1-in. throughs from the lower deck are split and fed to a pair of simplicity 3- by 10-ft. triple-deck screens carrying ⅝-, ¼-, and 3/16-in. wire cloth mesh.

Coarse material, principally the plus 2½-in. product rejected by the Seco screen, is chuted to a Telsmith 36-in. Gyrasphere for crushing, the resulting product being sized by a Stephens-Adamson 2½- by 8-ft. double-deck screen. Material in the 1½- to 1-in. range and, optionally, the top-deck rejects by a 36-in. cone crusher, the product of the cone being elevated to a Pioneer screen carrying ¾-, ½-, and ¼-in. cloth mesh on its three decks for final sizing. The resulting products and crusher fines passing the lower deck go to the bins below. All crusher and screens are flexibly arranged so the flow may be adjusted to produce the type of material in particular demand.

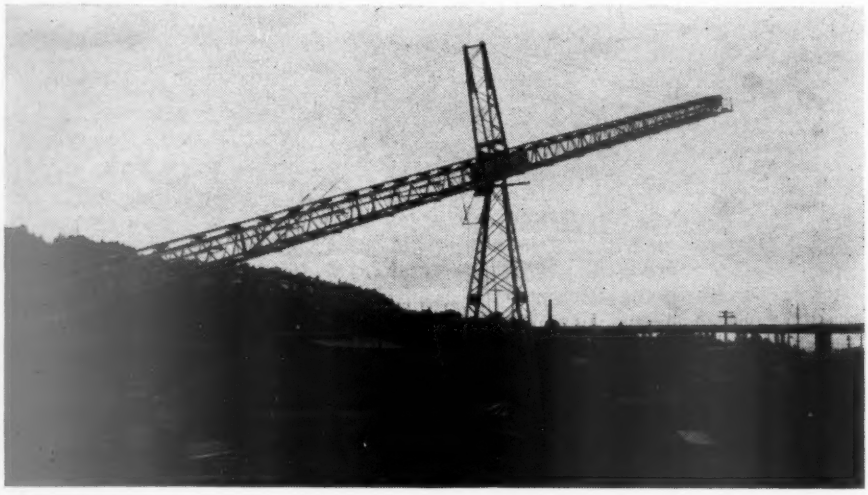
The minus 3/16-in. fines and water passing the two Simplicity screens are processed for sand, the material being flumed to a Dorr 20-ft.-diameter thickener, or hydroseparator, where the dirty water, trash, fine particles of bark, etc., are floated away to waste, concentrating the sand at a common outlet to feed a pair of 8-pocket Dorrco sizers located on a level below. These sizers are arranged in tandem to effect hydraulic classification of the sands into as many as eight accurately-sized products if desired. Such minute separation is not ordinarily desired, however, and spigot discharges from the sizers are combined so as to yield commercial concrete and plaster sands. A 1,000-gal. water tank above the sizers maintains constant water pressure for the hindered settling action in the sizer compartments. The sized sands are dewatered by a pair of drags and a screw before going to three of the ten finished-material bins.

The bins are arranged in three rows of three each, with one independent sand bin alongside. They are of cylindrical steel construction and each has a capacity of 125 cu. yd. of material. Three 24-in. by 65-ft. reclaiming belts operate beneath each set of three bins and these feed



• Left: A part of the recrushing is handled by the cone crusher seen on the platform.
• Right: One of the screens used in the new plant; this one is scalping plus 2½-in. material on the top deck.

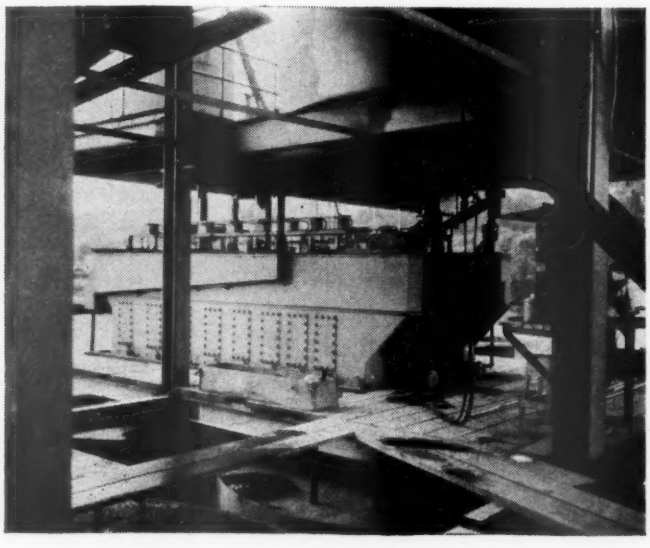
• The recovery conveyor alongside the bins. Two cross-conveyor which feed it may be seen in the background.



• The 200-ft. radial stacker being installed at the plant. This equipment is used for open storage of finished materials.

• The 20-ft. hydroseparator makes the initial classification of the sand and floats away deleterious material.

• Right: One of a pair of 8-pocket sizers below the hydroseparator, arranged in tandem, separates as many as eight accurately sized products.



a 24-in. by 80-ft. common recovery belt operating at right angles to the cross belts. Thus, any size or blend of aggregates can be loaded out into trucks at the discharge end of the recovery belt.

A system of open storage is now nearing completion at the plant. At the end of the recovery belt, where the trucks are presently loaded (either for delivery, or for transporting surplus material to ground storage), a 24-in. by 200-ft. radial stacker belt has been erected, supported by an A-frame tower mounted on flanged wheels. The 56-in.-gauge track over which the stacker will operate is laid out on an arc with a radius of 105 ft. and will provide the plant with a tremendous capacity for open storage of finished material. The method of reclaiming the material from ground storage and loading into trucks has not been definitely decided.

The plant is powered by electricity, the individual motors on the various machines having a total connected horsepower of 625. Wash water is pumped from the river by a Layne-Bowler pump driven by a 75-hp. motor, supplying 1,750 g.p.m. through an 8-in. discharge line.

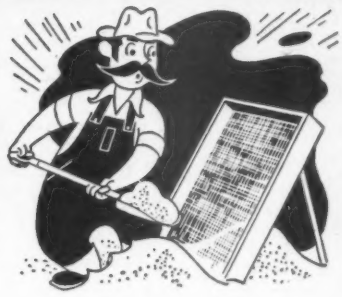
Three ready-mixed concrete plants are operated for the company in Portland by its subsidiary, the Ready Mixed Concrete Co., and a large part of the output of the plant is destined to be marketed in this manner.

Carl Kubitz is superintendent of the Curry St. plant; Howard Hamlin is the operating foreman.

Correction

We failed to identify the three heavy-duty, 30-ft. log washers mentioned in the Noralyn Mine story in our June issue, page 66. These machines, which are among the largest ever built, were furnished by the McLanahan & Stone Corporation, Hollidaysburg, Pa.

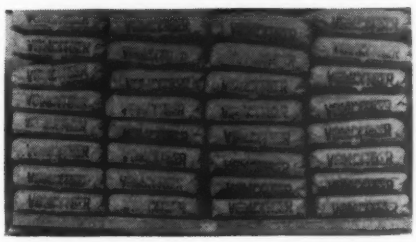
Screenings



by William M. Avery

GEORGE COGGINS, president of Bee Tree Vermiculite Mines, Inc., Asheville, N. C., has taken issue with our item in the June issue, in which we undertook a tongue-in-cheek comment on the DIGEST'S *Vermiculite, Strangest of Minerals* article. In his letter on the subject Mr. Coggins states that his own careful reading of the DIGEST article reveals no attempt to create the impression that vermiculite concrete will take the place of sand and stone concrete in load-bearing applications.

We'd like to point out, however, that the article makes absolutely no effort to clarify that very point, which strikes us as being highly pertinent to any discussion of a development described as "likely to revolutionize building construction."



In our discussion we overworked our option on whimsy by stating brashly that as an aggregate in load-bearing concrete we had the impression that vermiculite ranks between Grape Nuts and Puffed Wheat. Mr. Coggins blitzed us on this by sending along a photograph (see cut) of a 6-ft. vermiculite concrete plank loaded with 3,000 lbs. of portland cement. His comment: "You can't do this with Puffed Wheat!" Ours: "With Puffed Wheat selling at 48 cents a pound, we're damned well not going to try!"

Baby Tender

THE Associated Press reports that an English lad, after being trapped for two hours in a concrete mixer, was hauled out dazed, bruised, naked, but otherwise unhurt. Obviously some refinements will be necessary before mixers can gain wide acceptance as baby tenders, but harassed parents will recognize the inherent soundness of the idea. Any mechanical contrivance that can immobilize our own offspring for two hours, deliver them stripped and too dazed to protest their nightly bath, and in the process inflict only a few minor bruises, has our wholehearted endorsement.

Giant Gyp

THE Cardiff giant, one of the country's more profitable practical jokes, after bouncing from pillar to post for the better part of 80 years, has at last found a permanent resting place in the Farmers' Museum of the New York State Historical Association. It isn't quite clear to us just why the Farmers' Museum was selected, but maybe it's just a holdover from the age-old notion that farmers comprise the more gullible fraction of our population.

Actually, the Goliath hoodwinked a good many eminent scientists and educators, as well as farmers, when it was unearthed near Cardiff, New York, in 1869. It was widely acclaimed as one of the most important and remarkable archeological finds ever made on the American continent. P. T. Barnum offered to buy it for $150,000, and when the offer was rejected had a replica made which he exhibited for some time as the original Cardiff giant. A couple of medical chaps finally exploded the myth by drilling the "original original," which proved to be composed of pure gypsum.

We have a theory that the slang term "gyp" may have been born out of this incident, but the trail is a bit muddy. In point of fact, the big guy, as an admitted fraud, earned even more money that he did as an archeological wonder.

Woman

ACME NEWS recently published this definitive analysis of the female of the species as seen through the eyes of a chemist:

Symbol—Wo.

Accepted Atomic Weight—128.

Physical Properties—boils at nothing and freezes in a minute. Melts when properly treated, but very bitter if not well used.

Occurrence—wherever man exists.

Chemical Properties — possesses great affinity for gold, silver, platinum and precious stones. Violent reaction if left alone, able to absorb vast amounts of food. Turns

green when placed beside a better looking specimen.

Uses—highly ornamental, useful as a tonic in acceleration of low spirits. Has natural aptitude for equalizing the distribution of wealth, and is probably the most effective income-reducing agent known.

Caution—very explosive in inexperienced hands.

Revolutionary, What?

AN item in the Adelaide, Australia, *Express* tells about a "revolutionary" new building material called Pyroc, which is made from lime, cement and vermiculite. "When sprayed on up to 8 inches thick," says the *Express,* "the material sets sufficiently in 50 minutes to be mechanically stable and economical the new building will be."

We'd be willing to bet that the new material isn't nearly as revolutionary as the *Express*' prose style. Not 'arf, blimey!

A. S. T. M. Makes Changes in Specifications For Aggregates, Cement, Building Units

another ON THE SPOT report

WHILE the Republicans were wrestling with affairs of state and Joe Louis was battling for a decision in the field of sports, those in attendance at the 51st Annual Meeting of the American Society for Testing Materials at Detroit

By C. E. PROUDLEY
Chief Materials & Test Engineer
N. C. State Highway & Public Works Comm.

were diligently engaged in matters of less general popular appeal but just as far-reaching in their importance to those associated with the construction industries. Specifications for quality and grading of mineral aggregates were revised and one session of the meeting was devoted entirely to a symposium on all phases of the production, use, testing and research on mineral aggregates such as sand, gravel, stone, slag and lightweight aggreates. Dimensions and requirements for building units were revised, making them more liberal. Methods for analysis of portland cement by optical means were given prominent consideration and there was the addition of specifications for Type IIIA cement, which is high-early-strength-air-entraining.

New officers of the society were installed. They include: president, Richard L. Templin (assistant director of research and chief engineer of tests, Aluminum Co. of America, New Kensington, Pa.); and vice-presidents, J. G. Morrow (metallurgical engineer, The Steel Company of Canada, Ltd.) and L. J. Markwardt (assistant director, U. S. Forest Products Laboratory, Madison, Wis.).

A report of all that transpired in the more than 300 subcommittee and committee meetings scattered throughout the three largest hotels in Detroit, June 21-25, would be interesting but practically impossible. The outstanding accomplishments of concern to the mineral aggregates and allied industries are summarized briefly.

The Division of Simplified Practice of the National Bureau of Standards has requested official approval of the latest proposed revisions of R 163-39 on coarse aggregates (crushed stone, gravel and slag). The request was referred to

H. F. Gonnerman

Committees C-9 on Concrete and Concrete Aggregates, and D-4 on Road and Paving Materials for the customary course of action to determine whether the society as a whole approves of the new sizes and the tightening of some of the grading limits. The new sizes are special for trickling filter media and for bituminous surface treatment. Among the coarser sizes of aggregate the gradings have been changed to reduce the tolerance above the nominal maximum size from 10 percent to 5 percent. Among the finer sizes additional limits have been recommended sharply to more define the lower end of the grading requirements. It will probably take until after the 1949 annual meeting of the society to secure final action on this subject.

Tentative specifications for ready-mixed concrete were adopted as standard without revision by Committee C-9 on Concrete and Concrete Aggregates. This committee also adopted as standard the terms relating to concrete and concrete aggregates, including definitions for admixture, blast-furnace slag, crushed gravel, crushed stone, elongated pieces, fineness modulus, flat piece, gravel and water-cement ratio. These definitions are of immense importance when preparing specifications for mineral aggregates. The standard method of test for organic impurities in sands for concrete (C40-33) was revised by deleting reference to the color plate for treated sands, leaving only the standard color produced by tannic acid. Further revision of this specification is likely in the future since it was pointed out that different color standards are produced by various grades of tannic acid. It is possible that some form of transparent permanent color standard may be developed by the committee for this purpose instead of using the tannic acid solution.

A symposium on methods and procedures used in identifying reactive materials in concrete was sponsored by Committee C-9. A paper by T. E. Stanton, California Division of Highways, on *Correlation of Laboratory Tests with Field Experience of Excessive Concrete Expansion Induced by a Reaction Between the Cement and Aggregate* was discussed by W. C. Hanna, H. S. Meissner and Bailey Tremper who seemed to agree that less than 0.6 percent alkali in portland cement, even with a reactive aggregate, may be expected to give good results in concrete. Alkali from other sources than the portland cement—from the sand for example—may contribute to the reaction but this would depend upon the nature of the occurrence of the alkali. In the paper on *Correlation of Laboratory Tests with Field Experience in Alkali-Aggregate Reaction* by Bailey Tremper, State of Washington Department of Highways, the author claimed close agreement between laboratory tests and field experience. His paper and some of the discussion which followed indicated that freezing and thawing tests on concrete made of the aggregates and cement in question give reliable information on the amount of alkali reaction to be expected in the concrete in service. However, sealed specimens for the freeze-thaw tests are essential.

R. C. Mielenz and L. P. Witte, Bureau of Reclamation, presented a paper on *Tests Used by the Bureau of Reclamation for Identifying Reactive Concrete Aggregates* in which they described a method of soaking the aggregate in 1 percent sodium hydroxide in stainless steel containers for 24 hours, after which the liquor is tested for reduction in alkalin-

R. S. Boynton

ity and change in the composition of the solution. D. O. Woolf and T. R. Smith, Public Roads Administration, presented *A Rapid Method of Testing Materials for the Alkali-Aggregate Reaction,* which uses common Mason jars treated to prevent reaction of the glass. The jars are nearly filled with mortar made of the questionable aggregate and a high-alkali cement and, after hardening, are sealed, with a slight excess of water present to continue the hydration and reaction. Cracking of the glass jar within 30 days or less is evidence of excessive expansion and the test is claimed to be valuable in screening the questionable from the satisfactory aggregates for use in concrete.

The symposium on alkali-aggregate reactivity was concluded with a paper by Bryant Mather, Corps of Engineers, on the *Petrographic Identification of Reactive Constituents in Concrete Aggregate.* He recommended the use of petrographic techniques to distinguish between bad actors and others, principally by accurate determination of the index of refraction. Opalines, chalcedony, crystoballite and tridymite are the forms of silica which cause most of the trouble in the presence of alkali. It is interesting to note that several years ago, when the reaction of certain aggregates with portland cements containing relatively high quantities of soluable alkalis came under close observation and study, it was not difficult to find sources of high-alkali cement with which to make the studies. Now, the cement chemists tell us, it is almost impossible to locate a portland cement source with much over 0.6 percent alkali.

In the report of Committee C-9 on Concrete and Concrete Aggregates it is mentioned that the standard specification for lightweight aggregates for concrete (C130-42) is due for major revision under the chairmanship of P. M. Woodworth, Waylite Co., Chicago. Another major change mentioned in the C-9 report, pertains to a proposed method of determining the acceptability of air-entraining agents for use in concrete. Chairman of the subcommittee, Bryant Mather, states that it is proposed to develop a method of test or system of examination by means of which the air-entraing agent will be rated. Any laboratory, properly equipped, could perform the service which, at present, is the prerogative solely of A.S.T.M. Committee C-1 and the National Bureau of Standards jointly.

Election of officers for Committee C-9 saw the incumbents continued except for the replacement of two members of the executive committee by A. A. Levison (Blaw-Knox Co.), and J. H. Swanberg (Minnesota Highway Dept.).

Portland cement manufacturers and users will be interested to know that the tentative revision of C175-47T recommended by Committee C-1 on cement, includes a new Type IIIA which has the same chemical requirements as the present Type III. Soundness and time of set are the same but requirements for air content of mortar are being inserted as 18 ± 3 percent by volume; the compressive strength at one day is 1,100 p.s.i. minimum, and at 3 days

A. T. Goldbeck

P. M. Woodworth

2,200 p.s.i. minimum. The tentative specifications for portland blast-furnace slag cement (C205---T) has been revised also to include requirements for a Type IS-A air-entraining portland blast-furnace slag cement.

Standard specifications for portland cement (C150-47) have been recommended by Committee C-1 for tentaive revision to raise the compressive strength of Type V cement at 7 days from 1000 p.s.i to 1,500 p.s.i., and at 28 days from 2,200 p.s.i. to 3000 p.s.i Type V tensile strength requirements are raised from 175 p.s.i. at 7 days to 250 p.s.i., and at 28 days from 300 p.s.i. to 325 p.s.i. Suggested revision of Type IV cement requirements were not adopted, and the specification for Type IV remains unchanged.

Tests made by the cement reference laboratory under the joint supervision of Committee C-1, the National Bureau of Standards and the Public Roads Administration, have resulted in securing information on material 109-B (2 methyl 2-4pentane diol) manufactured by the Master Builders Co. as a non-harmful addition when added in an amount not exceeding 0.03 percent by weight of cement, except that in Type III cement a maximum of 0.05 percent may be used. When added in these amounts 109-B entrains air to a slight degree but not sufficiently to bring the air entrainment within the limits recommended by Specification C175 for air-entraining portland cements.

Three new tentative methods for determining titanium oxide in portland cement have been developed

for addition to the tentative methods of chemical analysis of portland cement (C116-46T). At one session M. F. Hasler, C. E. Harvey and F. W. Barley, Applied Research Laboratories, presented a paper on *The Spectrochemical Analysis of Cements and Other Mineral Products* in which they described optical methods by means of which sodium, potassium, manganese, titanium, magnesium, iron and alumina (but not sulphur or phosphorus) can be determined in portland cement or raw materials for portland cement manufacture, with accuracies of from 2 to 6 percent standard deviation within one-half hour. The flame photometer was dicussed by L. R. Pritchard (Lone Star Cement Corp.), R. H. Bogue (National Bureau of Standards) and W. H. Hanna (California Portland Cement Co.), who seemed to be of the opinion that this apparatus has many practical advantages although there are still imperfections to be overcome.

Users of portland cement will applaud the increasing interest of members of Committee C-1 in what is termed premature stiffening of portland cement. This undesirable characteristic is frequently overlooked in the laboratory but is a menace to good construction in the field. It is thought that a test for detecting it in the laboratory may be developed. This characteristic of premature stiffening is believed by some to be due to grinding at temperatures of 300 deg. F. or higher.

Magnesium Oxychloride Cements, Committee C-2, under the chairmanship of L. S. Wells, National Bureau of Standards, are now covered in the society's specifications by 16 methods of tests, 9 of which are new and the others revisions of recently adopted tentative methods. H. E. Chisholm (Westvaco Chlorine Products Corp.) presented a paper describing *New Type Weighted Needles for Determining the Setting Times of Magnesium Oxychloride Cements,* which, he said, could very well be considered by Committee C-1 as a method for use with portland cement. The apparatus is fully automatic and uses needles which have a shoulder near the flat points. The imprint of the shoulder determines the setting time.

Manufactured masonry units, including vitrified clay and concrete, are under the jurisdiction of Committee C-15. Newly elected officers of this committee are: Chairman, J. W. Whittemore (Virginia Polytechnic Institute); first vice-chairman, T. I. Coe (American Institute of Architects); second vice-chairman, P. M. Woodworth (The Waylite Co.), and secretary, J. A. Lee (Structural Clay Products Institute).

W. C. Hanna

Specifications for common brick and face brick were revised so that brick may be cored up to 25 percent voids, provided that the dimensions from the edge of the brick to the edge of the core does not exceed ¾ inch. Structural clay tile specifications (C34 and C56) have been revised so that smooth tile will be acceptable for plaster base so long as they are not glazed and their absorption is not less than 5 percent. These and other revisions recommended are subject to approval first by ballot of the entire membership of Committee C-15, and then the society as a whole, which is in accordance with regulations of the society governing the approval of all standards, tentatives, revisions, etc.

Committee C-12 on mortars for unit masonry, under new officers, is working on the co-ordination of proposed specifications for masonry mortar with corresponding specifications of other committees, also the further revision of *proposed methods of sampling and testing Mortar for Unit Masonry,* as published in the A.S.T.M. Bulletin No. 94, October, 1938. The new officers are as follows: Chairman, T. I. Coe first vice-chairman, J. W. Whittemore; second vice-chairman, H. D. Baylor; and secretary, J. A. Lee.

Refractories are becoming more important and widely used in industry, as is indicated by the distribution of the C-8 *Manual on Refractories* recently prepared by the editorial subcommittee of Committee C-8 under the chairmanship of L. J. Trostel, General Refractories Co. Membership on the committee may be enlarged because of the increased amount of work to be done. New officers include the following: Chairman, R. B. Sosman (Rutgers University); vice-chairman, R. S. Bradley (Green Fire Brick Co.); and secretary, W. R. Kerr, Armstrong Cork Co. Among other recommended revisions to definitions and specifications, the minimum modulus of rupture for low-duty fireclay brick, Type G, will be increased from 500 p.s.i to 800 p.s.i., in the specifications for *Refractories for Heavy Duty Boiler Service* (C64-47), *Refractories for Incinerators* (C106-47), and *Refractories for Moderate Duty Boiler Service* (C153-47).

Committee C-7 on lime recommended for advancement to standard the *Tentative Specifications for Special Finishing Hydrated Lime* (C206-46T), *Tentative Specifications for Hydrated Lime for Masonry Purposes* (C207-46T), and the *Tentative Methods of Physical Tests of Quicklime and Hydrated Lime* (C110-45T). The election of officers continued W. C. Voss (Massachusetts Institute of Technology) as chairman, L. K. Herndon (Ohio State University) and E. E. Eakins (Pure Lime Corp.) as vice-chairmen, and R. S. Boynton (National Lime Assn.) as secretary. The committee considered and reaffirmed standard specifications coming under their jurisdiction which had stood unrevised for six years.

A tentative method of test for durability of slate for roofing is recommended for publication by Committee C-18 on Natural Building Stones. This test uses a seven-day immersion in a one percent sulphuric acid solution as the basis for comparison which is reported as the increase in the absorption between that determined before treatment and after. C-18 proposed also a tentative method of test for combined effect of temperature cycles and weak salt solutions on natural building stone. Thirty cycles of exposure, partially submerged in shallow containers of gypsum and water in an oven at 105 deg. C. until dry, constitutes the test procedure. Increase in absorption and increase in volume of the specimens are reported. Tentative definitions of terms relating to natural building stones make their first appearance on recommendation of Committee C-18. The definitions include granite, commercial granite, limestone, dolomite, travertine, marble (with various descriptive adjectives), greenstone, sandstone and

quartzite. A special definition of the term "slate" (C119-27) has been recommended for revision and will result in a somewhat more accurate description of this important building material. The new officers of Committee C-18 include: Chairman, L. W. Currier (U. S. Geological Survey); vice-chairman, T. I. Coe (American Institute of Architects); and secretary, F. S. Eaton (Research and Design Institute, Inc.). D. W. Kessler was appointed as the representative of the society on the American Standards Association project for formulating a specification for granite.

A symposium on mineral aggregates was sponsored by Committee D-4 on road and paving materials which included 14 papers. When all discussion has been received the society will print the symposium as a special publication at prices to be announced later. The various sections of the symposium make an interesting table of contents, and it is anticipated that there will be considerable demand when it becomes available. The titles and authors are as follows:

Distribution of Mineral Aggregates by K. B. Woods (Purdue University); *Petrographic and Mineralogic Characteristics of Aggregates* by Roger Rhoades and Richard C. Mielenz (Bureau of Reclamation); *Physical and Chemical Tests and Their Significance* by Harold S. Sweet (Joint Highway Research Project, Purdue University); *Sampling of Mineral Aggregates* by C. E. Proudley (North Carolina State Highway and Public Works Commission); *Production and Manufacturer of Fine and Coarse Aggregates* by Nathan C. Rockwood (*Rock Products*); *Grading of Aggregates for Bituminous Construction* by Jewell R. Benson (Bureau of Reclamation); *Grading of Mineral Aggregates for Portland Cement, Concrete, and Mortars* by Walter H. Price (Bureau of Reclamation); *Influence on Mineral Aggregates on the Strength and Durability of Concrete* by C. W. Allen (Ohio State Department of Highways); *Lightweight Aggregates* by R. E. Davis and J. W. Kelly (University of California); *Mineral Aggregates for Bituminous Construction* by J. T. Pauls and C. A. Carpenter, Public Roads Administration); *Mineral Aggregates for Low-Cost Roads and Water-Bound Macadams* by Edward A. Willis and James A. Kelley, Jr. (Public Roads Administration); *Mineral Aggregates for Railroad Ballast* by A. T. Goldbeck (National Crushed Stone Assn., Inc.); *Mineral Aggregates in the Chemical and Processing Industries and in Certain Other Uses* by Herbert F. Kriege (The France Stone Co.); *Needed Research by D. O. Woolf* (Public Roads Administration).

Committee activity of D-4 other than that which pertains strictly to bituminous materials and the revision in minor details of some of the previously approved tentative or standard specifications was the recommendation of new tentative specifications for asphaltic mixtures for sheet asphalt pavements, and new tentative methods for sampling bituminous paving mixtures. Election of officers for Committee D-4 resulted in the installation of F. H. Baumann, New Jersey State Highway Dept., as chairman. The three vice-chairmen are A. T. Goldbeck (National Crushed Stone Assn.; E. W. Klinger (Standard Oil Co. of New Jersey); and C. E. Proudley (North Carolina State Highway and Public Works Commission). B. A. Anderton (The Barrett Division, Allied Chemical and Dye Corp.) was named secretary.

The final general session on cement, concrete and concrete aggregates was the occasion for the Sanford E. Thompson award, presented by Sanford E. Thompson himself, to W. C. Hanna, chief chemist and chemical engineer, California Portland Cement Co., Colton, Calif., for his paper on *Unfavorable Chemical Reactions of Aggregates in Concrete and a Suggested Corrective,* published in the 1947 proceedings. The Sanford E. Thompson award was established in 1938 by Committee C-9 as an annual token of recognition to the author of a paper of outstanding merit on concrete and concrete aggregates presented at an annual meeting of the society.

During the same session Harold S. Sweet, Purdue University, gave a paper on *Research on Concrete Durability as Affected by Coarse Aggregate* which created much interesting and complimentary discussion. Beam tests were made of aggregates after determining, among other characteristics, the voids and the percentage of water in the voids. Freeze-thaw tests of the beams were made and their condition determined by means of dynamic modulus tests. The number of cycles required to reduce the dynamic modulus a certain amount was the basis for comparison; and Mr. Sweet concluded that if more than 150 cycles were required the aggregate should be classed as good; bad aggregates usually deteriorated in 30 cycles or less. Microscopic examination of the agregate to measure the size of the void spaces led to the conclusion that the volume of spaces of less than .005-in. diameter was a critical value; if there were less than 0.06 percent of such voids the aggregate was usually good; if the percentage of this size was greater than 0.10 the aggregate was found to be nondurable in concrete. Destruction was caused also by wetting and drying, freezing and thawing, and temperature changes in the concrete, as well as by alkali reactivity. The standard sodium sulphate or magnesium sulphate soundness tests of the aggregates failed to indicate the behavior in concrete. Unconfined freezing and thawing tests of the aggregate were not indicative. The degree of saturation of the voids in the aggregate in the concrete influenced the durability of the concrete, which suggested that the durability might be increased if the aggregate was dried before mixing in concrete. P. D. Miesenhelder, Indiana State Highway Commission, discussed the paper stating that it was his experience that the freeze-thaw test was the best indicator of soundness. L. E. Gregg, Kentucky State Highway Dept., called attention to the possibility of the fine aggregate used with a given coarse aggregate as an influence on the behavior of concrete in soundness tests. Bryant Mather, U. S. Waterways Experiment Station, discussed further the influence of impossible fine and coarse aggregates in concrete. A. T. Goldbeck, National Crushed Stone Assn., expressed the thought that we should keep in mind the possibility of these other destructive influences in addition to the present popular alkali-aggregate reactivity.

Effect of Delayed Mixing of Prebatched Moist Aggregates and Cement on the Strength and Durability of Concrete, a paper by Walter H. Price and John W. Robinson, Bureau of Reclamation, indicated a reduction in compressive strength of approximately 4.5 percent for each hour's delay before mixing. There was some improvement in durability as measured by freezing and thawing tests up to two hours. In these tests the sand contained 7.5 percent moisture and the gravel 1.5 percent; the cement and aggregates were blended without the mixing water during the time of delay. A discussion by C. E. Proudly, North Carolina State Highway and Public Works Commission, presented results of flexure tests on concrete mixed after various periods of delay but with only 5 percent moisture in the sand and none in the coarse ag-

(*Continued on page* 79)

Instrumentation at the National Gypsum Company's Kimballton Plant*

INSTRUMENTATION is the method of using scientific instruments for control. The outstanding characteristic of instruments is that they yield tangible and practical dividends, determinable in dollars and cents, which dividends write off the original cost in a very few years, sometimes in a few weeks.

By CLARENCE B. COX
Electrical Engineer

Services of Instrumentation Instruments are acquired as capital investment because they render some of the following services to industry: labor savings, fuel saving, increased production, better quality of product, elimination of "rejects", uniformity of product produced, minimizing reliance on human watchfulness, and accident prevention.

Conditions Measurable Instruments as referred to in this discussion are measuring devices which measure one or more of the following conditions, thereby providing a basis for automatic and manual control: temperature, humidity, pressure (or vacuum), duration of timing (of operation or process), rate of speed (of mechanical parts), flow, liquid level, strength, and light. Six of these "conditions" are used to achieve control at our Kimballton (Va.) plant.

ROTARY KILNS

Limestone decomposes according to the reaction:

$$CaCO_3 = CaO + CO_2$$

We mine our limestone from the Mosheim deposit which was formed by marine deposition many millions of years ago, furnishing us with a raw material more than 98 percent pure limestone ($CaCO_3$) and containing small amounts of other elements, most important of which are magnesia, silica, iron and alumina.

After crushing and sizing, the stone enters preheaters to our rotary kilns, is quickly brought up to the inlet temperature of approximately 1000 deg. F. and slowly moves down the revolving kiln until calcination is complete several hours later, and is discharged at a temperature of about 2000 deg. F. into rotary coolers.

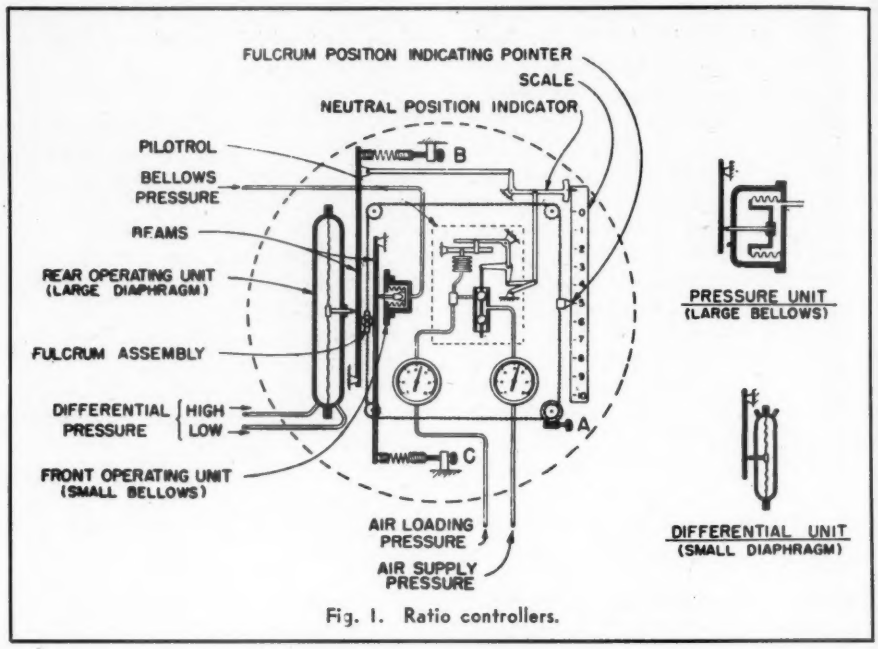


Fig. 1. Ratio controllers.

Equipment Involved We have two rotary kilns, each rated at 300 tons per 24 hours. Each kiln is 300 feet long, refractory lined, with a 10-ft. shell diameter at discharge end necked down to 8-ft. diameter at the inlet end. Each kiln has a ball-type coal pulverizer, primary air, induced draft and forced draft (cooler) fans, stone preheater, 4-speed motored kiln and feed drives, rotary cooler, skip hoist for conveying to storage, and air-operated control drives for all dampers and gate feeds necessary to kiln operation.

When it was described in the December, 1947, issue of Pit and Quarry, the new rotary-kiln lime plant of the National Gypsum Co. at Kimballton, Va., was rated as probably the best instrumented plant in the industry. As space in that plant-descriptive article permitted only a brief account of the control and instrumentation, we are pleased to be able to present to our readers the accompanying complete story of that phase of the operation. This article should be of interest to all lime producers, all operators of rotary kilns and many others. —The Editor.

Designs Our plant was designed to provide a continuous flow of stone from the mine to the kilns by machinery, and requires principally preventative maintenance and minor adjustments by operators to be kept in smooth running condition.

Our controls for the kilns were designed to permit the operator to decide the heat requirements, after which combustion conditions are maintained automatically—all control being centered at the firing floor.

Primary air flow was selected as the basic condition upon which all other combustion conditions with known ratio requirements are automatically controlled. For this reason primary air flow is controlled only by remote manual operation of the damper in its supply line.

Should any other combustion condition be selected as basic, such as quantity of fuel, the primary air could be controlled automatically through a ratio controller. (Fig. 1)

Controls Our kiln control panel (Fig. 2) is a neat and compact instrument board which contains recorders, controllers, indicating gauges, ammeters, indicating lights, selector valves, push buttons and alarms, all of which will be discussed later. From these instruments the trained operator develops a complete picture of the kiln operating conditions, making close and efficient control possible.

Control, other than electrical, is

*Presented at the 46th annual meeting of the National Lime Association at Hot Springs, Va.

achieved by air pressure, which is supplied at a constant pressure of 28 lbs./in. to the various controllers. Within these controllers is a pilot valve through which this pressure (loading pressure) may be varied from 5 to 25 p.s.i. in accordance with the regulating range of the instrument, the amount of loading pressure being determined by the variation of the controlled factor as measured by the metering element. As a change occurs in the controlled factor, the new relation produces a change in "loading pressure" to reposition the control drive and stabilize the controlled factor at a higher or lower point.

Primary Air Flow A pilot tube located at primary air intake to the ball-type coal pulverizer measures the flow which is recorded in lbs./hr. by the instrument. Control of the primary air flow is through remote manual operations only of the control drive to the primary air damper.

Coal-Air Temperature A resistance thermometer located in the top of the coal pulverizer measures the temperature of the air leaving the mill which is recorded by the instrument. A standard pointer is set at the desired temperature for operation of the mill (150 deg. F.) and through mechanical linkage the recording pin, when approaching this limiting temperature, makes "loading pressure" changes automatically, adjusting the control drive to a tempering air damper, thereby admitting cool air from the cooler fan to keep the mill at a safe operating temperature.

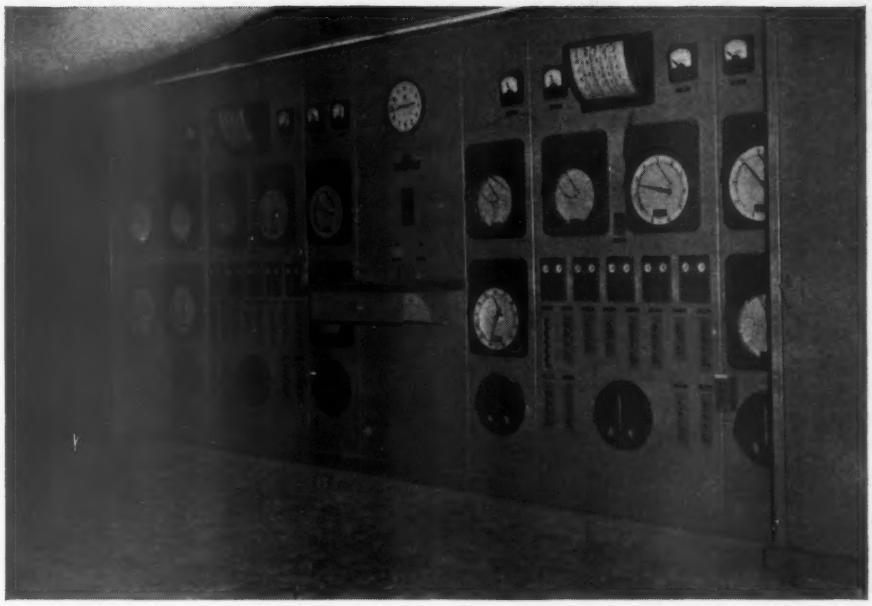


Fig. 2. Kiln control panel.

Secondary Air Flow A segmental orifice in the secondary air flow produces a pressure differential which is measured and recorded in lbs./hr. by the instrument. Automatic control of the flow is achieved through the primary-secondary air ratio controller which is discussed below.

Oxygen Recorder Our oxygen analyzer consists of an analyzer and recorder mounted independently and connected electrically, and used for the continuous determination of the volumetric percentage of oxygen in the exit gases of the kiln which is a measure of the excess air in the combustion process.

The analyzer employs the principle of catalytic combustion, using an excess of standardized fuel in the presence of a nobel-metal catalytic filament, and uses an alternating current self-balancing Wheatstone Bridge as a means of measurement.

A stainless steel water - washed sampling tube is placed in the hot gases at the feed end of the kiln and kept at a negative pressure by a gas pump and washer unit, which provides a continuous flow of flue gases, scrubs and dries the sample, and forces it into the anaylzer.

The filtered dry gas sample is delivered under pressure to the regulating valves of the analyzer which maintains a constant flow to the filament. The sample then passes around the exterior of the vaporizer wick and mixes with the vaporizer fuel (oxene); the mixture then passes up around the filament where catalytic combustion between the free oxygen and the sample of fuel occurs. The oxygen content of the gas determines the temperature of the burning gas, which temperature in turn determines the electrical resistance of the filament. This change in resistance is measured by means of the Wheatstone Bridge, then amplified and transmitted to the recorder which is calibrated in percent oxygen.

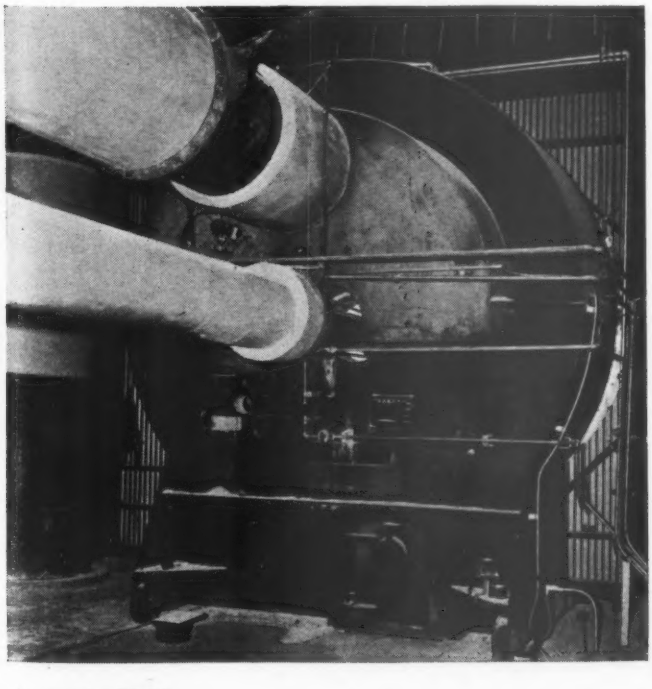


Fig. 3. Hood and insulated burner pipe of one of the two 8- by 10- by 300-ft. rotary kilns.

Kiln Temperature at Burning Zone A radiation pyrometer (Fig. 3) focused on the refractory lining at the burning (30-35 ft.) zone, measures the refractory temperature (T_1) which is recorded by the instrument.

Temperature of the gases at the 100 ft. (T_2), 200 ft. (T_3) and rock feed (T_4) are measured by thermocouples and recorded by their respective instruments. Readings from thermocouples T_2 and T_3 are received through collector rings, and T_4 direct from the thermocouple.

These instruments are recorders only, providing the operator with an accurate vision of the temperature conditions within the kiln.

Induced Draft Fan Temperature (T_5) A thermocouple located at intake to induced draft fan measures the temperatures of the exhaust gases which are recorded by the instrument. A standard pointer is set at the limiting temperature for the fan (700 deg. F.) and through mechanical linkage the recording pen, when approaching this limiting temperature makes "loading pressure" changes automatically adjusting the control drive to a tempering air damper, thereby protecting the fan from damaging temperatures.

Kiln Speed Recorder The kilns are powered by a.-c. 4-speed induction motors which provide a means of maintaining close control of the kilns. Four-speed motors are also provided for the Feed-o-weights and preheater (one kiln only), both of which change speed simultaneously with the kiln drive motor.

The speed of the kiln is measured by a d.-c. tachometer (generator) belted to the kiln drive speed reducer. Readings received are recorded by the instrument. Remote manual control of all four-speeds is had at the main control panel in the form of 4-speed selector push-buttons.

Pulverizer Feeder Ratio Controller The ratio controller consists essentially of two diaphragms which apply their operating forces on two beams separated by an adjustable fulcrum which is the means for ratio selection. The smaller diaphragm is actuated by the pressure differential across the pulverizer. The larger diaphragm is actuated by the differential across the primary air pitot-tube which is preset manually for a constant volume. An unbalance in these forces will move the mill differential beam, automatically making loading pressure adjustments to the control drive of the fuel feeder, thereby maintaining a constant fuel-air ratio.

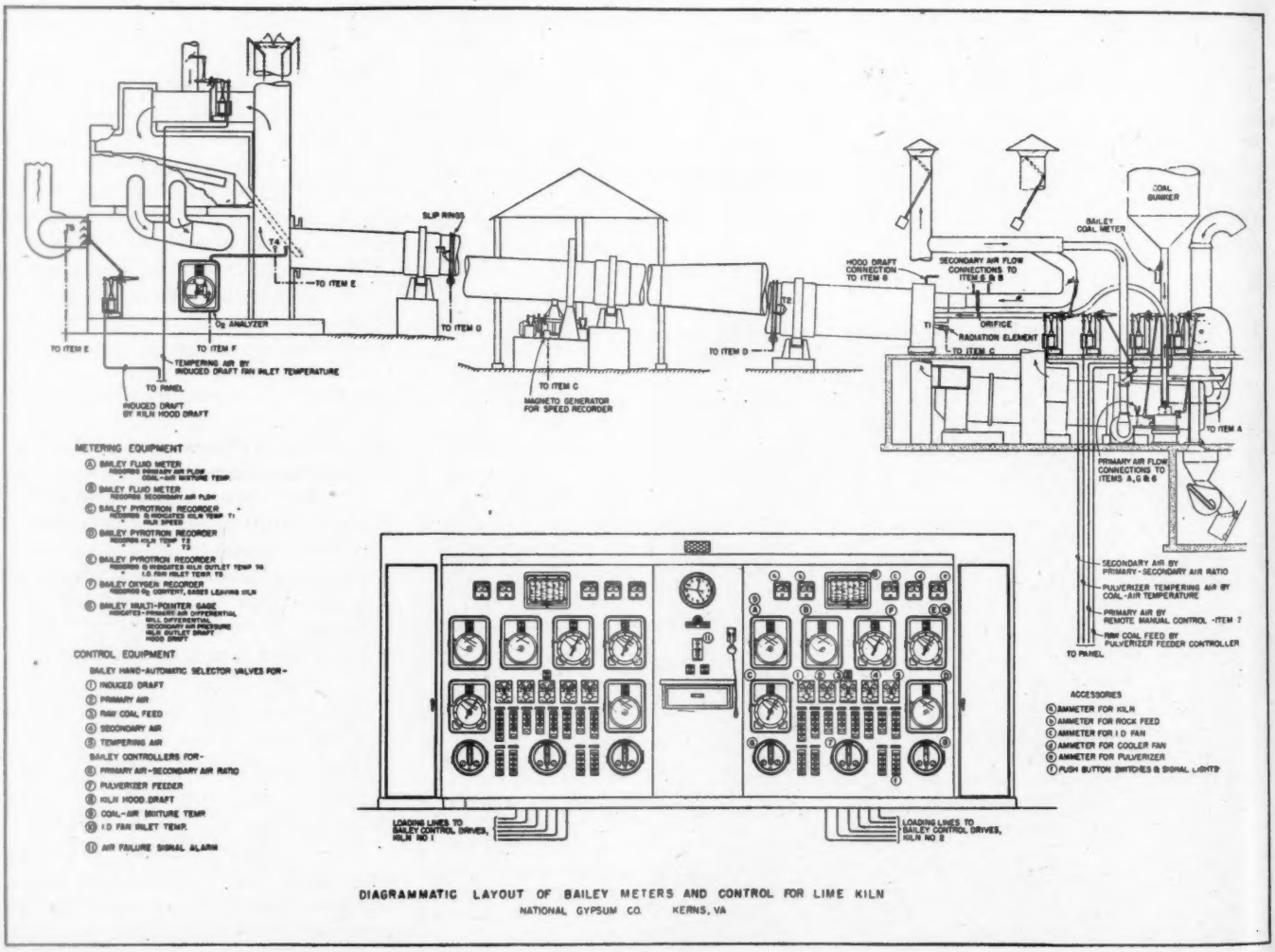
Primary-Secondary Air Ratio Controller Through a ratio controller similar to that for fuel-air ratio above, loading pressure changes are made to the control drive of the secondary air damper, maintaining automatically a preset ratio. Secondary air is thereby fed in a volume consistent to combustion needs.

Hood Draft Ratio Controller Through a ratio controller similar to that for fuel-air ratio above, loading changes are made to the control drive of the induced draft damper, maintaining automatically a preset hood draft negative pressure.

Multipointer Gauges Primary air differential, pulverizer differential, secondary air pressure, kiln outlet draft and hood draft transmit their impulses directly to their respective diaphragms of this instrument and through linkage the diaphragms move indicating pointers in accordance with the calibration of the gauge.

This instrument provides the operator at a glance with a picture of the differentials, pressures and drafts existing within the kiln, making close control at any instant possible.

Selector Valves These valves are used in the control system so that a choice is provided for either "hand" or "automatic" operation. When positioned for automatic control, the air ports permit transmission of air-loading impulses direct from controllers to the control drives. When positioned for hand control,


SLIP RINGS
TO ITEM E
TO ITEM F
TO ITEM D
TO ITEM C
TO PANEL
INDUCED DRAFT BY KILN HOOD DRAFT
TEMPERING AIR BY INDUCED DRAFT FAN INLET TEMPERATURE
MAGNETO GENERATOR FOR SPEED RECORDER
COAL BUNKER
BAILEY COAL METER
HOOD DRAFT CONNECTION TO ITEM G
SECONDARY AIR FLOW CONNECTIONS TO ITEMS B & B
ORIFICE
RADIATION ELEMENT
TO ITEM A
PRIMARY AIR FLOW CONNECTIONS TO ITEMS A, G & 6
SECONDARY AIR BY PRIMARY-SECONDARY AIR RATIO
PULVERIZER TEMPERING AIR BY COAL-AIR TEMPERATURE
PRIMARY AIR BY REMOTE MANUAL CONTROL - ITEM 7
RAW COAL FEED BY PULVERIZER FEEDER CONTROLLER
METERING EQUIPMENT
CONTROL EQUIPMENT
BAILEY HAND-AUTOMATIC SELECTOR VALVES FOR-
BAILEY CONTROLLERS FOR-
ACCESSORIES
LOADING LINES TO BAILEY CONTROL DRIVES, KILN NO 1
LOADING LINES TO BAILEY CONTROL DRIVES, KILN NO 2

DIAGRAMMATIC LAYOUT OF BAILEY METERS AND CONTROL FOR LIME KILN
NATIONAL GYPSUM CO. KERNS, VA

the air ports bypass the controllers and permit changes to be made by hand in the air-loading impulses to the control drives.

Selector valves are provided for selective controls of the induced draft, primary air, coal feed, secondary air and tempering air dampers.

Control Drives These drives (Fig. 4) consist of a double-acting air cylinder mounted on a pivotal base and provided with a bellow-actuated double-acting air pilot valve and restoring spring, which cause the drive to assume a definite position for every incoming air pressure. By the use of these control drives remote operation, either automatically or manually, from a central location is obtained over all dampers and feed gates required for kiln control.

Coal Feed Meter A vane projects into the spout through which coal is delivered to the pulverizer. The movement of the coal causes the vane to turn a definite amount with each foot of coal travel. This motion is transferred through a flexible shaft to the counter, which reading, when multiplied by the volume per foot of travel, provides an accurate measure of the coal consumed.

Indicating Lights and Ammeters All motors upon which kiln operation depend are started, stopped and speed changed from the main panel board. Red and green lights indicate "stop" and "run" for all constant-speed motors, and amber for 4-speed motors. Amber lights which are energized by mercoid switches (attached to paddles inserted in the stone flow) indicate when stone is being fed into the kiln.

Ammeters which accurately indicate the running motor loads are provided for, with rock feed, induced draft fan, cooler fan, and pulverizer motor drives providing a valuable aid in maintaining a high load factor, without overload on the motors.

Safety Features and Alarms To prevent dangerous conditions and to reduce to the minimum jams caused by machinery failure and human error, a system of alarms and electrical interlocking of motors has been arranged.

Alarms A spring set diaphragm, located at the exhaust end of the kiln, is connected to a relay, and when pressure within the kiln falls below the minimum required for safety, the diaphragm releases the relay, which in turn trips out the pulverizer and sounds an alarm on the firing floor.

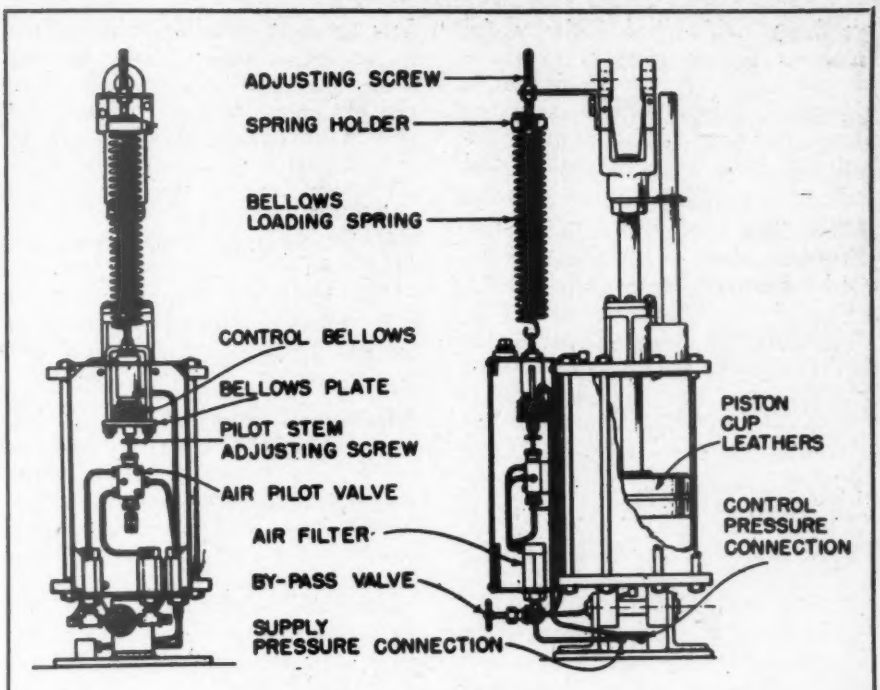


Fig. 4. Control drive.

Alarms are also provided on the firing floor: against low water pressure on the reprocessed water system which is used to cool all kiln bearings; against delayed return of the skip hoists for lime being discharged from the coolers; and against air pressure failure to the various recorders, controllers and control drives.

Electrical Interlocking Through electrically connecting the control circuits of the various magnetic starters, the motors driving screens, elevators, conveyors, etc., which feed the kiln, are arranged to stop the feed immediately in event of failure of any unit, eliminating to a large degree "down time" due to jams.

Interlocking of the induced draft fan with the coal pulverizer insures an adequate draft within the kiln before fuel is added, minimizing the possibility of "flash back."

The discharge end is also interlocked with the various conveyors, and Hum-mer screens which move and size the burned lime for storage.

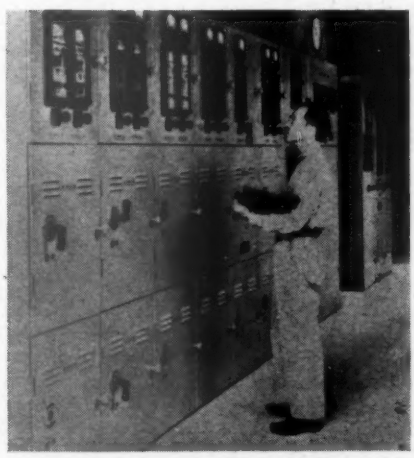


Fig. 5. Substation switchgear.

Summary Cost of instrumentation for both kilns approximates $35,000 and for this investment we believe that instrumentation is currently paying for itself in closer control of all operating conditions, which results in maximum output and standard quality from all units at all times. Also operators with skill developed to a lesser degree may be employed, as on kiln operation, where it is necessary for them only to decide that more heat or less heat is required and all adjustments are automatically made when the primary air is manually increased or decreased. Furthermore it is felt that the accurate chart records built up over a period of time on all phases of kiln operation are among the best tools for the company's active program of improvement in lime production methods.

HYDRATION

Burned lime unites with water according to the reaction:

$$CaO + H_2O = Ca(OH)_2$$

Normally the fines, ⅛-in. to dust, (equipment rated to ½-in.) are screened from the larger stone during the sizing operation before storage, and conveyed to a large catenary bin over the hydrator. The raw lime is then fed through a constant-

weight, variable-speed feeder to the Schaffer continuous hydrator, where water in measured quantities is thoroughly mixed, forming hydrated lime. The finished lime is then elevated to bins to await milling and bagging.

Recording Thermometer and Ammeter A gas bulb which is very sensitive to temperature variations is placed in the hydrating mixture within the hydrator. The temperature of the reaction is then recorded by a graphic instrument. An ammeter has also been provided which indicates the running current of the motor driving the hydrator.

These instruments provide the operator with a means of determining the quantity of water required for complete hydration and protect the equipment. When too much water is added, the temperature drops and the load factor on the motor and hydrator builds up rapidly. If a slight deficiency of water exists, increased heating results, signifying incomplete hydration. By adjusting the water supply to the proper temperature a quality product can be obtained and production boosted.

Summary Investment for the recording thermometer and ammeter, including installation expenses, should not exceed $250, which should be easily returned within a year through increased production, even if quality of product is ignored.

PULVERIZED STONE

During the crushing and screening process preparatory for burning all stone, ⅜-in. to dust, which is not suitable for burning, is conveyed to the flour plant. To facilitate the grinding of this otherwise waste material, heat is added to drive off the free moisture, thereby eliminating mill plug-ups, boosting production, and improving the quality of our mine dust and other pulverized stone products.

To eliminate the dangers of an oil fired furnace, whose heat and possibly unburned fuel is circulated through the pulverizers, electronic controls were provided to prevent to the maximum degree, the possibilities of explosion.

Wheelco Flametrol During ignition when the start button is engaged, this instrument automatically releases a solenoid valve permitting Pyrofax gas to flow to the pilot light and be ignited by an electric spark. Once lit, the flame contacts an insulated "flame rod" through which a stream of electrons flow to the grounding flame. This grounding operation permits a relay in the Flametrol to pick up, starting the oil pump and oil blower, and opening another solenoid valve in the oil feed line. Once the oil is lit, a photo-electric eye which is focused on the oil flame takes control, opens the damper, and closes down the pilot light.

Should the oil flame die out for any cause, the furnace is shut down automatically and the ignition process is repeated by the Flametrol.

Wheelco Capacitrol and Throttletrol To control the heat of the pulverizers within desirable limits, thermocouples have been added in the top of each mill. The temperatures measured by these thermocouples are transmitted to the "Capacitrol", an electronic instrument whose function is to adjust through movements of the "Throttletrol" (a reversible motor-operating instrument) the oil supply valve, thereby keeping the temperatures within the selected limits.

Summary Cost and installation of this equipment approximate $750, of which 50 percent is principally a safety measure; however, production figures reflect that the resulting economy of fuel should amortize the investment the first year of operation.

SUBSTATION

Our electric power (Fig. 6) is supplied and metered at 33,000 v., then transformed through two separate delta-delta-connected, 1500-kv.-a. banks of transformers to 2,400 and 480 v., respectively. Distribution is made at 2,400 v. to large crushing, fan and air compressor motors and also to portable substations within the mine. Distribution at 480 v. is made to all other plant motors, lighting transformers and controls.

Each distribution system is subdivided into circuits to the various producton activites involved and sectonalized from the main bus by circuit breakers to clear faulted circuits, thereby maintaining continuous service to the rest of the plant.

Watt-Hour Meters The substation design of individual circuits with circuit breakers to the various production activities is ideal for accurately determining the power consumed by each circuit. Utilizing the current transformers and potential transformers already necessary for circuit breaker operation, watt-hour meters have been added for each circuit to furnish accurate power consumption figures for that activity. These figures can in turn be accurately broken down into unit costs for the various products, which is valuable in cost analysis.

Recording Voltmeter Recording voltmeters with whose operation most of us are familiar have been provided for both 2,400-v. and 480-v. bus, furnishing a continuous record of the bus voltages.

Recording Demand-Meters Recording demand - meters (Westinghouse—Type RI-2) have also been installed on both buses. These instruments comprise two sets of identical standard watt-hour meter elements, one of which is connected to measure the true watts and the other is connected through a phase shifting transformer to measure the vars (reactive component). In addition the meter contains a ball-type differential mechanism arranged to add the motion of the two meter elements vectorially and thereby drive a demand register in proportion to the vectorial sum of the kilowatts and kilovars. Through a system of gears, the demand register transmits once each 15-minute period to the recording pin the total kilowatts and kilovars consumed during that period. The vectorial motion of these two meter elements is also transmitted to a small indicator hand whose scale calibration shows in percent power factor the relation of these two vectors at any instant.

These meters provide a continuous record of the voltage delivered and load demands for any particular period, and are valuable aids in analyzing, peak demand reduction, power factor correction, feeder voltage regulation and the like. By utilizing the main bus current and potential transformers the investment cost was limited to the installed cost of the meters themselves.

Overload Protection Time overcurrent relays are provided for all bus and branch circuit breakers which automatically trip out the breaker to a circuit in fault.

This type of relay is commonly used for electrical protection in industry and additional discussion is probably unnecessary.

Ground Lights The low voltage side of each bank of transformers is delta-connected and is advantageous in that two phases of 3-phase circuit must contact one another or become grounded to pro-

duce a short circuit. In most cases one phase becomes grounded and if detected at once can be cleared before a second phase has an opportunity to fault and cause an outrage.

Ground lights are installed on both 2400- and 480-v. buses, and burn continuously. They are connected across the secondary circuit winding of a 3-phase transformer whose primary winding is connected star. The midpoint of the star winding is grounded, and when a conductor of any circuit becomes grounded, the ground light for the corresponding phase goes out, indicating a fault, since the voltage of the primary winding between that phase and ground becomes zero.

Summary Investment in our substation for watt-hour meters, recording voltmeters, recording demand meters, overload protection, and ground lights will approximate $1,500. For this reasonable investment we have gained: an accurate record of consumption by circuit for production cost analysis; a continuous record of voltage delivered and consequently a record of outrages, including a basis for determining the cause of low voltage; a continuous record of demand loads, valuable when used to reschedule plant operations to reduce peak loads, thereby reducing the cost per kw.h.; a continuous record of power factor, from which the need of synchronous motors and capacitors to relieve circuit and equipment capacity can be determined; overload protection for sectionalizing faults, and protecting cables and equipment in event of fault and heavy overload; through ground lights an advance warning of faulty insulation, the correction of which will reduce breakdowns due to failure.

MAINTENANCE

It cannot be emphasized too strongly that an instrument is useless unless maintained in an accurate working condition at all times, for to depend on an instrument which is unreliable can easily produce unsafe conditions and production losses that are very expensive.

To achieve accurate and continued operations of instruments we must adopt a preventive maintenance system, that is, a systematic cleaning, repairing, and verifying calibration of the instruments.

Operator Maintenance Each operator whose responsibility is influenced by instruments should be trained to change recording charts, add ink, etc.; clean periodically—daily if necessary; make minor adjustments and repairs, which do not affect calibration; and know the principles involved in measurements made by instruments upon which he must depend.

General Repair and Calibration A technician who thoroughly understands the principles involved in operation of the instruments and who is properly equipped should: check calibration periodically; replace unit assemblies and make adjustments, and instruct the operators in maintenance duties.

Factory Repairs An instrument requiring delicate adjustment or repairs, above the skill of the technician, should be sent to the factory for repairs.

Maintenance Supplies Spare parts should be stocked for each type of instrument, the failure of which would make the instrument inoperative until parts could be procured.

Maintenance supplies, such as charts, ink, light oil, cleaning fluid and the like, should be available at all times.

CONCLUSION

The result of the experience gained thus far in our operation seems to indicate, not only a substantial saving obtained from adequate instrumentation because of increased efficiency, fuel economy, etc., but also, even more important, a definite improvement in quality of the product produced for our markets. Obviously, in the lime and stone business, as in all others, one of our most important although intangible assets is satisfied customers. The use of instrumentation in our process is of marked assistance in producing a quality product for our customers; and a quality product is certainly an important factor in maintaining the customer's good will.

A.S.T.M. Meeting

(*From page* 73)

gregate. The cement was in a layer between the damp sand and the dry stone and it was found that the reduction in beam strength was between one-half and three-quarters of one percent for each hour of delay. M. A. Swayze, Lone Star Cement Corp., discussed the probable cause for the apparent increase in durability of the concrete. W. C. Hanna (California Portland Cement Co.), F. A. Anderegg (John B. Pierce Foundation) and H. F. Gonnerman (Portland Cement Assn.) discussed the behavior of concrete which is mixed or remixed after a considerable period of delay.

An annual event of outstanding interest to all members of the society is the Edgar Marburg Lecture. The purpose of this lecture is to have described at annual meetings of the society, by leaders in their respective fields, outstanding developments in the promotion of knowledge of engineering materials. The lecture honors and perpetuates the memory of Edgar Marburg, the first secretary of the society, who placed its work on a firm foundation and brought wide recognition to the society as a forum for the discussion of the properties and tests of engineering materials. This year Dr. P. C. Aebersold, chief of the Isotopes Division of the Atomic Energy Commission, spoke on *Isotopes and Their Application in the Field of Industrial Materials.* In the demonstrations accompanying his lecture a few of the applications were shown such as the measurement of thicknesses and amounts of substances almost infinitely small. Of future application of atomic energy he said that uranium alone could provide all the heat and power needed in the world for the next 50 years and if thorium can be converted to fissionable material the world's atomic fuel needs could be met for more than 100 years. However, under the most favorable circumstances he predicts that it will require 20 years to develop the use of this type of power so that any considerable portion of the needs will. be commercially available Meanwhile, the use of isotopes is gaining in value and variety of applications daily.

Honorable mention should be given to the eighth exhibit of testing apparatus and related equipment provided by 45 manufacturers and agents serving the testing, inspection and research profession. Competent representatives demonstrated and explained the latest developments in scientific apparatus and methods, making information available which it would not be feasible to furnish under any other circumstances so mutually convenient.

As evidence of the growing condition of the river sand-and-gravel business, the Paducah, Ky., Marine Ways reports the completion of 13 new and complete sand-and-gravel barges. This work has taken a good part of the time in this particular boat yard.

Liverpool Materials Company Justifies Faith in Local Venture

By EDWARD BRUNENKANT

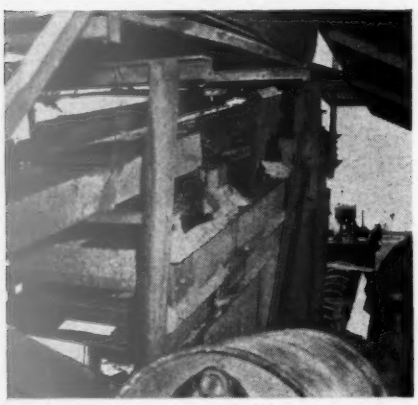
another ON THE SPOT report

THE Liverpool Materials Co. of Canton, Ill., was organized in December, 1938, by a small group of farmers, headed by Oscar Linn. Initially the company was formed to provide limited amounts of sand and gravel to farmers in the immediate vicinity. Much to everyone's surprise the demand for gravel was so large that the original $2,000 investment was returned during the first two months of operation. With this type of encouragement, the officials of the company embarked upon a slow but steady expansion program and today own and operate three plants.

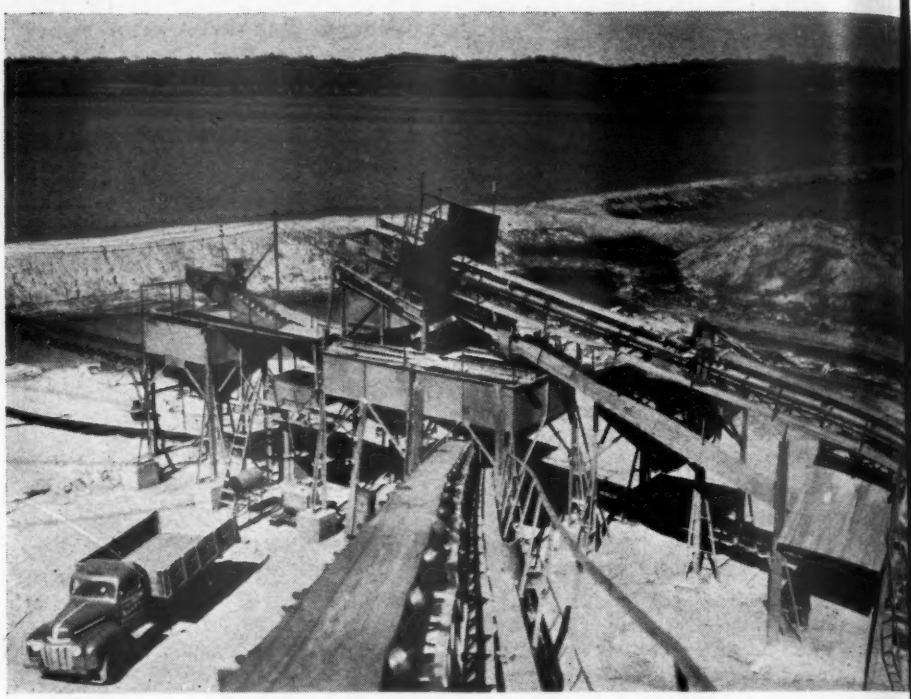
The Spoon River plant is located on an 80-acre tract of land approximately 15 miles west of Canton. Sand and gravel were first recovered from this deposit in 1941 with a small portable plant. As demand grew, the present permanent plant facilities were built.

Today the deposit is excavated with a slackline cableway and a 2-cu. yd. Sauerman scraper bucket which is operated from a 2-drum hoist. By working the pond in a fan shape around the plant (35 ft. deep with a 600-ft. radius), the cableway can be operated for 150 ft. without moving the deadman.

The main conveyor, 20 in. by 137 ft., discharges the pit-run material on a Simplicity triple-deck, 3- by 6-ft. vibrating screen. By the rather simple expedient of replacing the old 18-in conveyor belt with a 20-in. unit, the capacity of the plant was stepped-up 10 tons per hour. Of course, the idlers and pulleys were already wide enough to handle the larger belt.



• Each cloth of the three-deck vibrating screen is divided into two sections, so that only that portion of the cloth which receives the heaviest wear need be replaced.



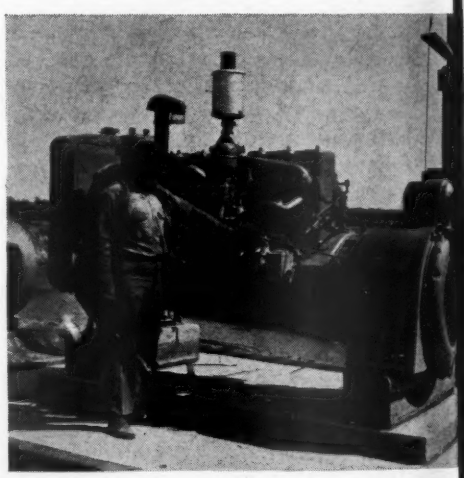
• Looking down upon the plant from atop the 42-ft. high gravel stockpiling conveyor.

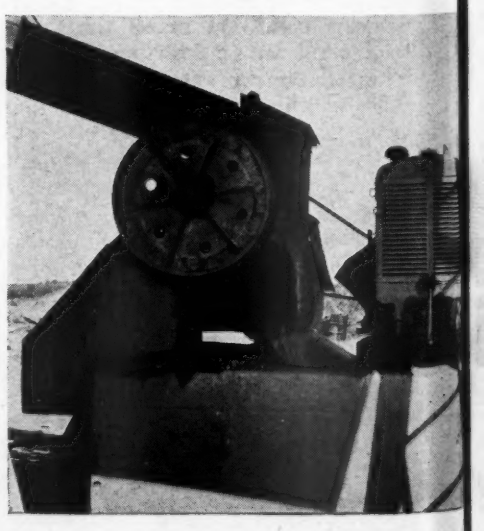
Each deck of the 3-deck vibrating screen is divided into two sections. With this division, only that section of screen cloth which is worn out need be replaced. According to Don Ford, superintendent, three front end cloths are put on for every two screen cloths for the rear sections. This arrangement cuts down on the size and number of screen cloths purchased.

Oversize off the 1⅛-in. top deck is chuted down for further reduction in a Universal 4- by 20-in. jaw crusher. Material off the middle (½-in.) and the bottom (¼-in.) decks is combined and stored in four 30-ton Diamond Iron Works bins. Water is sprayed over the middle deck and also on the bottom of the belt. Wash water is supplied by two portable Rex pumps—one 6-in. and one 4-in.

The sand passing through the bottom screen flows into a 24-in.

(*Continued on page* 85)





• Right, above: Dan Ford, foreman, moves the controls of the new diesel-electric generator. Power from this unit will be used to run the new electric motors which shortly will replace the present internal combustion engines.

• Right: Material off the top deck of the vibrating screen is chuted back to the 4- by 20-in. jaw crusher for further reduction.

G. A. Rychner, Federal Institute of Technology.

Technical Research Advisory Laboratory of the Swiss Cement Industry

Unique Service Perfected Through Extensive Testing Program at Wildegg

By LOUIS S. PHILLIPP JR.

Werner Humm, D.SC., Ch.E. Director of Research E. G. Portland.

another P&Q exclusive

IN Switzerland an active and modern laboratory maintained and operated by the association of manufacturers of portland cement is doing much to maintain high building standards and to keep architects, engineers, contractors, foremen, and workers informed as to the best ways of using portland cement. At present housed in a modernistic new building, the Technical Research and Advisory Laboratory of the E. G. Portland[1] in Switzerland has been an important link between cement user and manufacturer since 1932.

Originally the laboratory was set up in the existing but unused plant of an old cement company at Hausen, which was acquired by the E. G. Portland for this purpose.[2] With the rapid acceptance of the laboratory by the industry, and the resulting extension of activities, more space was needed, and in 1935 the facilities were moved to the premises of still another cement company, which had gone bankrupt.

Finally in 1938 the present building was constructed at Wildegg. The new structure is built of the latest materials in the cement and concrete products field. It is surrounded by a concrete drive, and is intended to act as a sort of living advertisement to prospective cement users.

The new building was built and is owned by the firm of Betonstrassen A. G. (i.e.—corporation) which occupies the upper story. Betonstrassen A. G. is a company formed by the members of E. G. Portland to further the knowledge of the construction of concrete highways, and to make available to builders equipment for use in laying concrete roads. While the firm itself does not engage in the construction of highways, it draws up plans, makes estimates of costs, rents equipment, and gives advice. This service is justified, as concrete is still rarely used for building roads in Switzerland, partly due to the high original cost, and partly to local politics.

All roads in Switzerland are built and maintained by the cantons, or states, which are relatively small. Since highway building is a rare event, these states prefer to maintain present roads rather than appropriate large sums for new ones. This remains the case, although contrary to the Swiss idea of thriftiness, because contemporary road construction companies have a certain amount of power which they wield in favor of maintenance of old highways. This policy gives them continual work, whereas they are apprehensive about building roads which will require little attention for many years.

The space occupied by the laboratory is rented from the Betonstrassen A. G., and this somewhat complicated tie-up seems to indicate that permanent tenancy of the laboratory is assured.

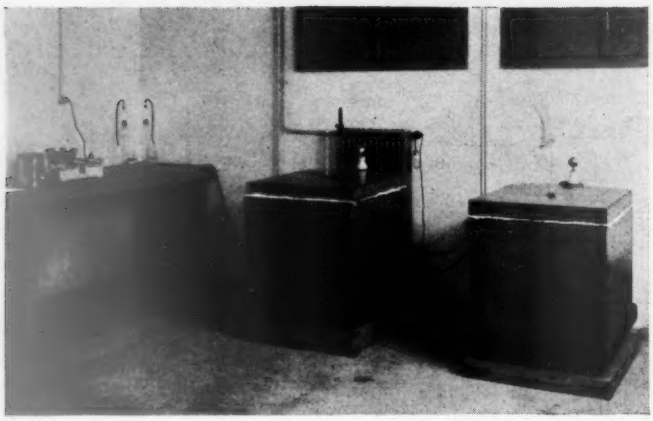
In these days, when free economy is under fire in many lands, it is worth while to delve briefly into the history of the E. G. Portland, if for no other reason than to see how another country and its people tackled the problems of competition and pricing.

In 1901 the E. G. Portland Trust was formed to regulate prices and control the quantity and quality of cement produced. The trust was formed in the belief that it was necessary for the Swiss manufacturers of cement to present a united front on questions of production and pricing, in order to avoid cut-throat methods, and to maintain the industry's standards at a high level. The original trust organization was given its own capital and the right to fix production and prices of the in-

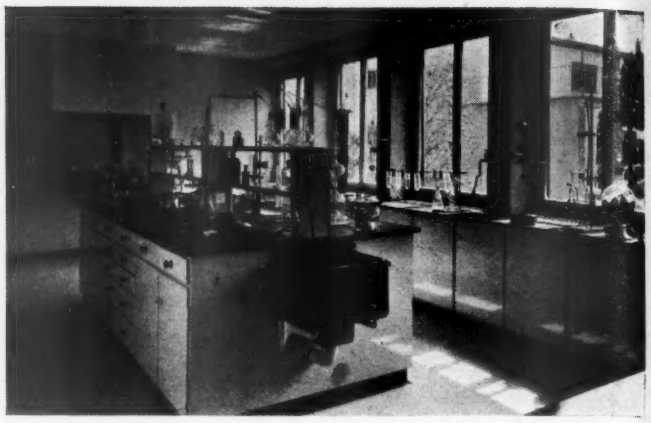
• Modern building of E. G. Portland at Wildegg, Switzerland.

[1] E. G. Portland, *Eingetragene Genossenschaft Portland*, is the Germany way of expressing "Registered Trust Co.," and might be translated literally "Portland Cement Association (of Switzerland)". All producers of Portland Cement in Switzerland belong to this "trust-in-fact."

[2] It is interesting to note that this factory was built and operated by Germans in an attempt to cut into the home market in Switzerland. Counter measures were immediately taken by the Swiss, and a cement plant built in Germany in retaliation. The German venture was abandoned in less than two years.



• Insulated boxes with thermometers used to measure heat change during setting.



• A part of the completely equipped chemical laboratory in the E. G. Portland building.

dividual manufacturers as it saw fit. In 1901 Swiss companies sold 260,000 metric tons of cement.

It soon became apparent that the bylaws of the first company, known as A. G. Portland, were too rigid, and that it could not, therefore cope satisfactorily with many important problems. Accordingly, in 1911, it was reformed into the present E. G. Portland trust, and has survived practically without change since that time.

Among the functions of the present E. G. Portland is that of assigning quotas of production, regulating prices (delivered), and maintaining the high standards of the industry. All this, the Swiss feel, has a stabilizing effect on the industry.

Only portland cement is produced in quantity in Switzerland, under specifications which are somewhat different from those for Type 1 American portland. Some high-early-strength cement and a very small amount of quick-setting cement are made in one factory.

The following excerpt from the manual entitled *Standards for Binding Materials Used in the Preparation of Mortars and Concretes,* published by the Swiss Society of Engineers and Architects[3] gives a general idea of the type of standard maintained.

VI. Portland Cement

1. Portland cement is defined as a product obtained by the homogeneous grinding of clinker and gypsum; it must not contain a total of more than 10 percent by weight of insolubles, of calcium carbonate ($CaCO_3$), and of calcium sulphate ($CaSO_4$).

2. The clinker is made by a process of burning a mixture of definite proportions of clay, silicates, and limestones to the point of incipient fusion.

3. Fineness of grinding: The residue left on a screen of 4900/cm² should be 10 percent. Tolerance of plus 25 percent.

4. At the temperature of plus 18 degrees C., portland cement should show the following setting times. (Vicat needle test.)

A. Initial set: Not before 2½ hours.

B. Final set: Not before 7 hours after gauging.

5. Portland cement should prove sound in air or under water. It must withstand a boiling water test (one hour is standard); the distance between the points of the tongs in the performance of the Le Chatelier test must not exceed 8 mm.

6. The percentage of insoluble substances plus $CaCO_3$ must not exceed 5 percent; that of SO_3, 2.5 percent; and that of magnesium oxide (MgO), 4 percent. Tolerances of plus 30 percent are allowable, provided the basic provision of section 1, above, is not violated. (10 percent total.)

7. Prisms (testing blocks) 4 by 4 by 16 cm. (weighing 562 gms.) of normal mixture (1:3 by weight) with a "plastic" consistency (by the addition of 11 percent of water), allowed to harden under water (plus 18 degrees C.) must possess the following average strengths:

Age	Ultimate Bending Strength	Compressive Strength
7 days	35 kg./sq. cm.	180 kg./sq. cm.
28 days	45 kg./sq. cm.	275 kg./sq. cm.

Allowable tolerance: minus 10 percent.

8. Portland cements are suitable for all work in air or water and especially for that work which necessitates great strength in the first period of hardening, or which are exposed to freeziing, unseasonable weather changes, or are in positions requiring a great deal of resistance to wear.

9. In working with cement in water, it is necessary to wait until the cement has set before exposing it to the action of running water, in order that the development of maximum resistance may not be hindered.

Taking average figures for American cements, it will be seen that in general Swiss standards (for strength) are roughly 50 percent higher. It does not follow, however, that Swiss cement is 50 percent better, as a 2-in. test cube is used in this country and a 4-cm. modified cube in Switzerland. Also, the mortar is not the same in the two specifications.

United States Type 1 portland, normally showing an actual comprehensive strength of about 5000 lbs. sq. in. at 28 days, or about 367 kg./sq. cm., can be compared to the figures in the table above.

A further comparison can be made from the figures for Swiss high-early-strength cement from the table of standards, which are given below.

Age	Ultimate Bending Strength	Compressive Strength
3 days	40 kg./sq. cm.	250 kg./sq. cm.
7 days	50 kg./sq. cm.	340 kg./sq. cm.
28 days	60 kg./sq. cm.	420 kg./sq. cm.

Allowable tolerance: minus 10 percent.

That higher standards are maintained is also indicated by the amount of insolubles permissible. Sulphates, $CaCO_3$ and MgO are kept to a maximum of 10 percent, as compared to about 16 percent allowable in the United States cements. Typical test results of cements actually produced in Switzerland are given below.

Under the able direction of Werner Humm, Doctor of Engineering, graduate of the Federal Institute of Technology at Zurich, and member of the Societe Suisse des Ingenieurs et des Architectes, the laboratory

	Strengths			
	Portland Cement		High Early Strength	
Days	Bending	Compressive	Bending	Compressive
3	—	—	52 kg./sq. cm.	280 kg./sq. cm.
7	47 kg./sq. cm.	245 kg./sq. cm.	63 kg./sq. cm.	385 kg./sq. cm.
28	62 kg./sq. cm.	350 kg./sq. cm.	72 kg./sq. cm.	480 kg./sq. cm.

[3]Entitled: *Normes pour les Liants Servant a la Preparation de Mortiers et Betons,* published 1933, with supplement dated 1945, by the Societe Suisse des Ingenieurs et des Architects.

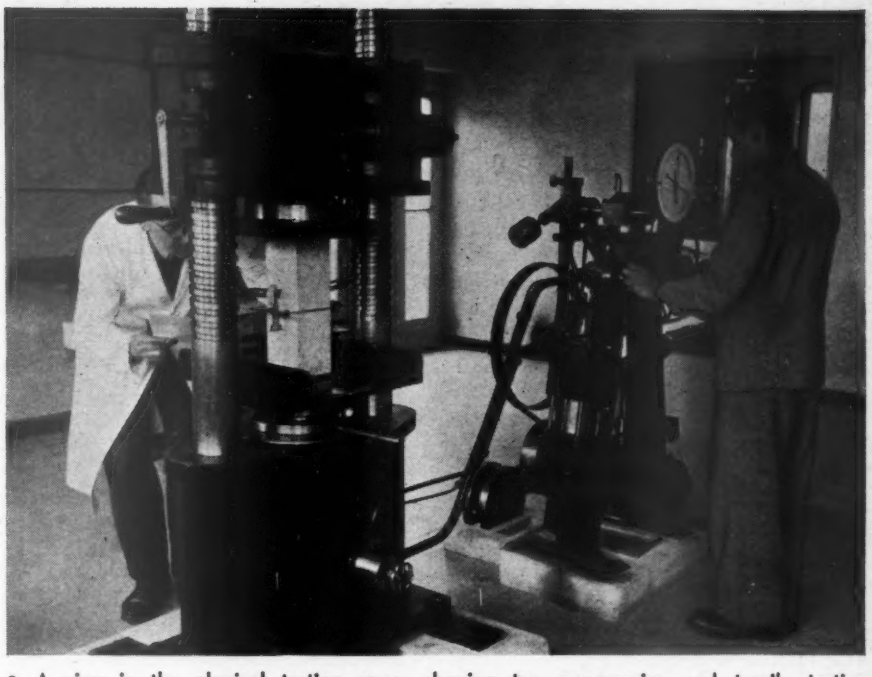
personnel at Wildegg takes an active interest in advancing the knowledge of the science of cement and its uses. Dr. Humm is aided in his work by G. A. Rychner, engineer and graduate of the Federal Institute of Technology, who was formerly with the Swiss Bureau of Standards. In addition there is a staff of two laboratory technicians, a secretary, and a general helper.

In the new laboratory, the following rooms and equipment are provided:

1. Physical testing laboratory, where problems of grinding, size, strength, and adhesiveness are carried out, and where test blocks are made up.
2. Testing room, where elasticity and compressive strength tests are made. (A maximum pressure of 250 tons is possible.)
3. Chemical analysis laboratory, with photographic equipment and darkroom, and equipment for the study of structure, composition, and changes in dimensions.
4. A weighing and microscope room, with a polarization microscope.
5. Wet storage room.
6. Constant temperature room.
7. Dry storage room.
8. Concrete laboratory, with appropriate mechanical equipment, and adjacent screening and material storage rooms.
9. Offices, library, and archives.

The laboratory has special equipment for measuring the color of cement and producing colors as desired; a diamond saw and polishing machine; ultra-violet analysis apparatus; equipment for determining water loss and heat development in cement.

It is of interest to review the methods and testing techniques used at Wildegg in order that a comparison may be made with current laboratory practices in the United States and elsewhere.



• A view in the physical testing room, showing two compression and tensile testing machines.

Fineness of the plant-ground cement is tested by several methods. For tests required under the cement standards, a vibrating screen or sieve is used, the screen carrying a 4900 mesh/sq. cm. screen, which corresponds to the United States number 170 screen.

For the use of the laboratory a second screening device has been built. This is a long brass pipe mounted vertically on the wall and fitted with a small glass bulb at the lower end. A partial vacuum is created in the tube, the air being drawn out at the top. A controllable low-pressure valve allows a small amount of air to enter the lower part of the apparatus, thereby creating an upward draft in the pipe. The cement to be tested is placed in the glass bulb at the bottom, and the cement dust is drawn upward by the air current.

A small motor equipped with an eccentric drive shaft causes a small hammer to strike the pipe about halfway up its length, and the resultant vibration precipitates particles clinging to the walls. The lower valve is controlled by a gauge showing the pressure against a column of water, and the rate of rapping can be controlled by a rheostat.

• A view showing the concrete mixer and a slump test being made.

This device gives a somewhat more accurate grading than that obtained by the use of an ordinary screen, with the amount of residue at the bottom of the tube indicating the fineness of the cement. Heavy particle residue must not exceed 10 percent under Swiss standards. This apparatus was developed at the Wildegg laboratory. The pipe used is about three inches in diameter, and is about six feet long.

Tests concerning setting time are made with a Vicat needle, and are similar to the methods used in the United States. The sample is placed beneath a needle of one square millimeter in cross section, which is mounted beneath a gauge.

The ability of the needle to penetrate the concrete and the amount of pressure required indicate the time of the initial and final set. Normal portland cement should not set sooner than 2½ hours after mixing. The "initial set" is defined as that time when the Vicat needle, under a pressure of 300 grams, or about .66 pounds, will no longer completely penetrate the sample. The time of the "final set" is said to be reached when the needle will no longer enter the sample. This should be at least seven hours after mixing, under Swiss standards.

Soundness of the cement is determined in several ways. In one method cement pats of flat samples

are dried on a hot plate, and the amount of cracking or buckling is observed. Accurate interpretation of this test requires a good first-hand knowledge of what a normal portland cement would do under the same conditions. Samples of a pretested or standard cement are generally tested at the same time to give an accurate comparison.

Cracks due to rapid contraction and drying are, of course, permissible, and are easily distinguishable from the breaks or cracks due to faulty cement. Balls of cement are tested in the same manner. The balls may also be boiled for one hour, tested, and observed.

For the soundness tests required by Swiss standards, the familiar Le Chatelier test is utilized. After an hour's immersion in boiling water, the amount of change in distance between the indicator points must not exceed 8 mm.

Tests relating to the tensile strength of concrete are not made in this laboratory, but equipment for determining bending and compressive strengths is available.

For this work test blocks 4 by 4 by 16 cm. are made up, and generally three blocks per test are made from each batch to be tested. The samples are allowed to harden for 24 hours, and are then placed in water at 15 degrees C. until the test is run off. In addition to the regular 3-, 7-, and 28-day tests, samples of all cements produced in Switzerland are kept for one year, and are tested at regular intervals.

Samples of this size are tested on a press of 10-ton capacity, and it is of interest to note that the halves of the block remaining after rupture of the sample are used to perform the compressive strength test. Other similar tests, using samples 10 by 10 by 50 cm. are performed on a second press with a maximum pressure of 250 tons. The larger samples are made up as regular concrete, the smaller ones according to the mixture prescribed in "Standards," Paragraph VI, 7, above.

The Whittemore Deformameter, a Swiss-made instrument, is used by the laboratory to measure the expansion on a surface or outside wall of concrete. Small points are set into the material to be tested, and the amount of change in the distance between them is compared with a standard bar of "invar" steel over a given period of time.

Recently the laboratory has discontinued the measurement of heat change during setting which involved the use of insulated boxes and a thermometer surrounded by test samples. The heat of solution method, developed in England, is now used. This, of course, can be done in the chemical laboratory in a very short time.

A new apparatus for testing the fineness of cement is currently in experimental use at Wildegg. With this equipment, cement is compressed into a glass tube about 1½-in. long, and is then placed in one elbow of a U-shaped tube containing a few inches of water. A vacuum is applied to the other side of the tube, causing the water to rise on that side of the "U," until it reaches a predetermined mark "A." At this point a valve at the top of the tube is closed, and the water level slowly falls away from point "A." The amount of time it takes the water to fall from point "A" to another predetermined point, "B," indicates the time it takes to draw a given amount of air through the compressed cement—a function of the fineness of the cement.

This is said to give a more accurate picture of the true fineness of the cement than does screening. (Switzerland, incidentally, is the only country in the world that produces fine bold silk of accurate mesh, and has supplied silk screening cloth to other countries for many years.)

The standard Brinell test for hardness has been adapted for cementitious materials at Wildegg, and is used when circumstances warrant.

Other operations of the laboratory closely parallel those of similar installations in the United States and elsewhere.

The avowed purpose of the Technical Research and Advisory Laboratory is twofold: (1) to supply consumers with advice, gathered by experience, so that they may make proper use of good cement; (2) to insure the continued production of a quality product and to develop and perfect improvements of that product.

The laboratory achieves maximum results by a fourfold program of research, counseling, inspection and testing; it serves as a fine example of what can be accomplished by a European industry.

Report on Operations of Potash Company of America

A survey of the operating procedures of the Potash Company of America in the Carlsbad region of New Mexico, one of the nation's chief sources of commercial-grade potash, is presented in a report made public by the U.S. Bureau of Mines.

Because potash deposits in the Carlsbad area resemble flat coal beds, coal-mining equipment and methods have been used successfully, according to the report, which also deals with the geology of the area, methods of sampling and estimation of tonnages and values, transportation and ventilation.

Other topics discussed in the report are safety measures, current wage scales, and company organization. Several photographs of the surface plant and underground workings as well as charts illustrating mining methods reviewed in the test are included in the publication.

Fuller's Earth Production Continues to Increase in 1947

According to the reports of producers to the U. S. Bureau of Mines, production of Fuller's Earth in the United States in 1947 totaled 329,068 short tons, valued at $4,660,614, a 10-percent increase in quantity over 1946. The quantity produced in 1947 was only 2 percent less than in the record year, 1930 (335,644 tons). The increase in Fuller's Earth production in 1947 was due largely to recent new uses for the commodity, namely, absorbent uses for oily floors, and insecticides. Decreases of 4 percent and 9 percent, respectively, were reported for mineral oils or greases and vegetable oils.

Producers reported that 59 percent of the total tonnage was consumed in mineral oil refining; absorbent uses 21 percent, vegetable oils 7 percent, rotary drilling mud 5 percent, insecticides 4 percent; other filtering and clarifying 3 percent; and the remainder in binder, chemicals, foundries, and various other uses.

Ross Island Sand-Gravel Co. Offers New Type of Material

Ross Island Sand & Gravel Company officials recently announced a new type of building material prepared at their plant at Portland, Ore. The new material, known as "Premix Drymix," was developed for small concrete jobs.

Each sack contains all ingredients properly proportioned, so that an amateur can do a good job by merely following simple directions. The three types of mixes are called "Premix Concretemix", "Premix Mortarmix" and "Premix Sandmix".

We Beg Your Pardon

We regret that we inadvertently made Miss Beatrice G. Gay secretary-treasurer of the National Crushed Stone Association in an item appearing in the columns of our July Personal Mention department. Miss Gay was elected to that office by the Washington Trade Association Executives at their annual meeting on June 2. There have been no changes in the N.C.S.A. staff.

Large quantities of fluorspar are moving by boat and barge on the Ohio River. Among the river craft transporting this commodity recently were the *Albert E. Heekin*, the *William Penn*, both diesel vessels, and the steamer *Monongahela*.

Streamlined Dredge Serves as Complete Processing Plant

• The Koch Sand & Gravel Company's new dredge was named for the firm's operating superintendent, John W. Ohl.

THE Koch Sand & Gravel Co., Evansville, Ind., operating on the Ohio River, has a new all-diesel-electric-powered hydraulic dredge, the *John W. Ohl,* which was designed, constructed and delivered by the Marine Division of the Maxon Construction Company of Tell City, Ind. The craft was named for the company's operating superintendent.

On the all-welded-steel hull (115 by 32 by 6 ft.) is the main deck house with its three compartments. The stern section contains pumps, spud hoist and anchor hoist; the center section houses the galley and crew quarters; and the bow compartment holds the main engine, generator, compressors, switchgear and central heating plant.

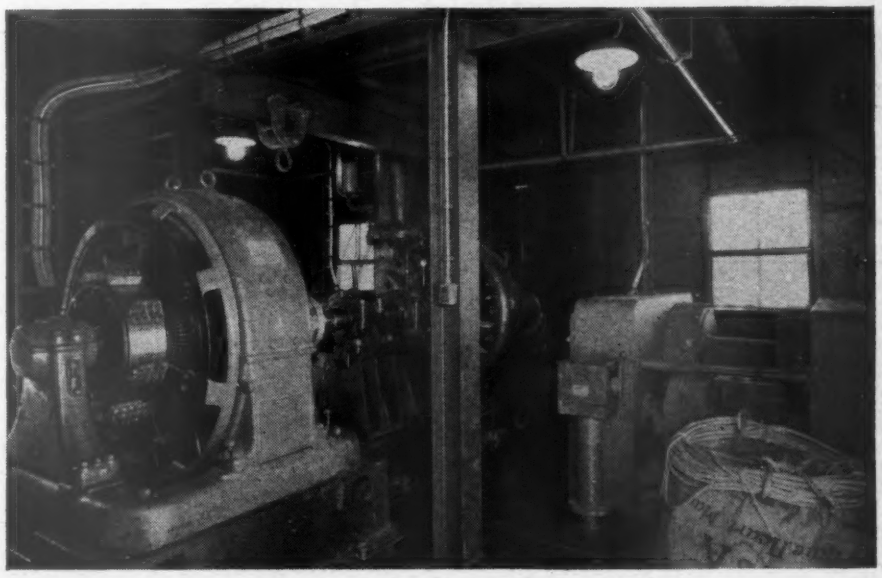
Above the deck house is the control house, which is divided into two floor levels. The lower one contains the shaker screen motors, suction hoist and motor, and the upper the controllers for the motors. Both levels are accessible by an inside stairway.

A 370-brake hp., 436-r.p.m. diesel engine, manufactured by the Worthington Pump and Machinery Corp., drives a 250-kw., 240/120-volt generator made by the Crocker Wheeler Mfg. Co. The auxiliary generator is a 10-kw., 120-volt, Type A510, driven by a Hill diesel engine. The diesel fuel is stored in two 10,000-gal. compartments formed by oil-tight bulkheads in the hull. Two air compressors are provided, one electric-motor-driven and the second gasoline-powered. The first (an Ingersoll-Rand Model 41W) is used for maintaining air for starting the main diesel engine, while the second (an Ingersoll-Rand Model S25BW) operates the air hoist and auxiliary equipment. The main suction pump, a Hydro-Seal Size 14/16, is manufactured by the Allen Sherman-Hoff Co. A Nash vacuum pump, Size L, is used as a priming pump. The main washing water is provided by three Dayton-Dowd vertical pumps—Size 4AV10½ and one Chicago vertical pump, size 6 by 8 in.

Shaker screens manufactured by the W. S. Tyler Co. are employed to process the sand and gravel. The material is loaded into barges by hinged chutes which are operated by winches. Ingersoll-Rand Type 9 HR air hoists are used to handle the gravel chutes. The main suction pipe is raised and lowered by an electrically-driven one-drum hoist, size 12 by 6 inches. Water for other uses is supplied by an A. Y. McDonald pressure pumping system and is filtered through a No. 4 Bowden single-valve quartz filter.

Modern living quarters are included for the crew. All compartments of the deck house are heated by a forced warm-air heating system (oil-fired type) manufactured by the Rudy Furnace Co., and a Rudd hot water heater, Series 600 provides hot water.

The *John W. Ohl* has been in operation since September 19, 1947, when it was given its final inspection by the owners, H. F. Koch, Bert Koenig and John W. Ohl.



• The interior of the deckhouse, showing the 250-kw., 240/120-volt generator (left) and the pump (background).

Liverpool Materials Co.

(*From page* 80)

Eagle single-screw washer. When both bins and the ground stockpile are heaped to capacity, the discharge end of the washer is opened and the sand is forced back to the pond by a Morse (3-in.) centrifugal pump.

Gravel is stockpiled with a 110-ft. belt conveyor discharging at a 42-ft. height. A separate 60-ft. conveyor stockpiles approximately 2,500 tons of sand.

In the near future all of the gasoline engines (nine in all) will be replaced with 35-hp. Westinghouse Life-Line electric motors. Electric power will be supplied by a new Caterpillar D 1300 diesel-electric generator. It is expected that this new set-up will cut the present $1,000 a month fuel bills in half.

Larger Primary Crusher Cuts Secondary Blasting 80 Percent

By WILLIAM M. AVERY

another ON THE SPOT report

IN shifting its quarry operations to a new location recently, the Hopkinsville Stone Co. of Hopkinsville, Ky., took advantage of the opportunity thus afforded to effect several important improvements. The old quarry, which had been in continuous operation since 1931, when the plant was built, had been worked to such depth that the average grade of the ramp was about 12 percent. Although there was additional stone available on adjacent property, the company was unable to work out a satisfactory basis for its purchase. Fortunately, however, there was a deposit of suitable stone on the opposite side of the plant and within reasonable hauling distance, and plans were formulated to begin operations on this site, where the maximum grade of ramp would not exceed 6 percent.

Core drillings on the site disclosed that there was excellent quality stone down to a depth of at least 105 ft. With 85 acres of this property at its disposal, the company regarded the relocation of the quarry as a prime opportunity to make major changes in the primary crushing setup, in the interest of increasing both output and over-all efficiency. Quarry operations had been rather severely handicapped by the large amount of secondary blasting required to reduce the stone to a size that could be fed to a small gyratory crusher, and the first objective was to relieve this bottleneck.

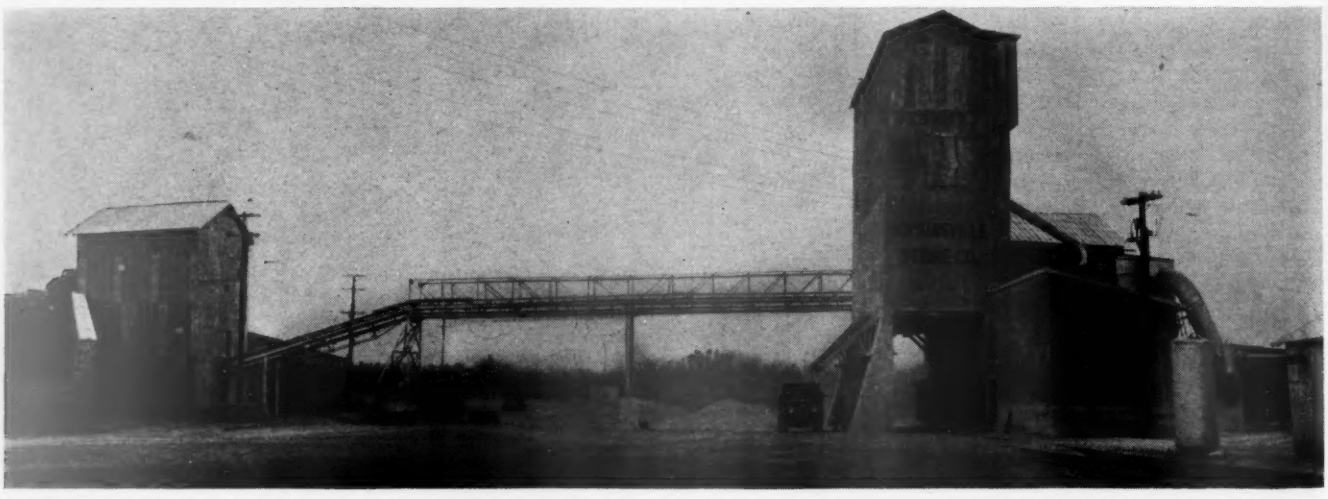
The unit ultimately selected for this purpose was a Traylor 30-by 42-in. jaw crusher, which will take any rock that can normally be handled with a 1¼-yd. dipper. It was decided to locate the primary between the new quarry and the plant, connecting the new crusher building with the main plant by means of a 24-in. by 200-ft. truss-supported Jeffrey belt conveyor. The entire installation is above ground, with the result that it is clean, completely free from water troubles, and entirely accessible for repairs. Some 50,000 cu. yds. of overburden from the new quarry site was used to build a long and unusually wide ramp for the haulage fleet. The fill is supported at the crusher building by stone-face reinforced-concrete wing walls which are 25 ft. in height and 140 ft. from end to end.

The crusher itself is driven by a 150-hp. Fairbanks-Morse motor through Goodyear V belts. It is fed from a steel truck hopper by means of a 48-in. by 12-ft. Traylor feeder, driven by a 15-hp. G.E. motor through V belts and a No. 4 Reeves variable speed reducer. An operator's station located in the crusher house has push-button controls for the feeder, the jaw crusher, and for the belt conveyor to the main plant.

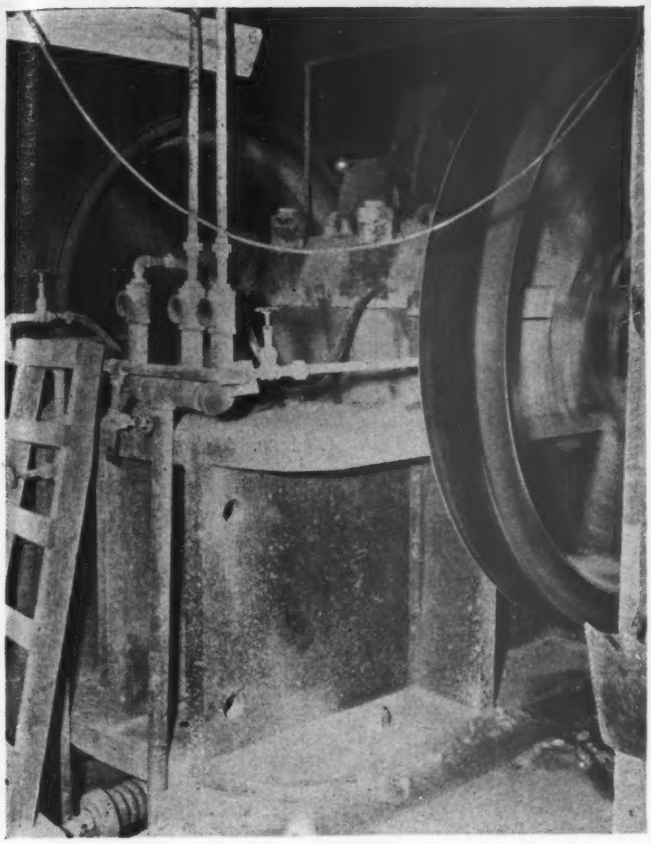
With this arrangement the company was able to make several important changes in the plant crushing set up. An Austin No. 107 gyratory, formerly used as a primary crusher, was switched to secondary crushing. With the Traylor jaw set at 3½ in., it was found that a 2½-in. setting on the gyratory was ideal, and made it possible to eliminate circulating loads altogether. These changes were promptly reflected in an increased output of all products amounting to about 225 tons per day. In 10 hours the Hopkinsville plant now produces about 1,200 tons of crushed stone products. Largely because of the reduction of grade, this increased output is being handled with no increase in the number or capacity of haulage units. In the new quarry overburden, consisting of dirt and stratified rock, ranges from 5 to 10 ft. in depth. Both stripping and recovery are handled with steam shovels, of which there are four now in service —one 1¼-yd. Marion and four ¾-yd. Bucyrus-Eries. The availability of cheap coal, the low price of used steam equipment, and the fact that its men are all experienced with steam are factors that delay the shift to more modern equipment.

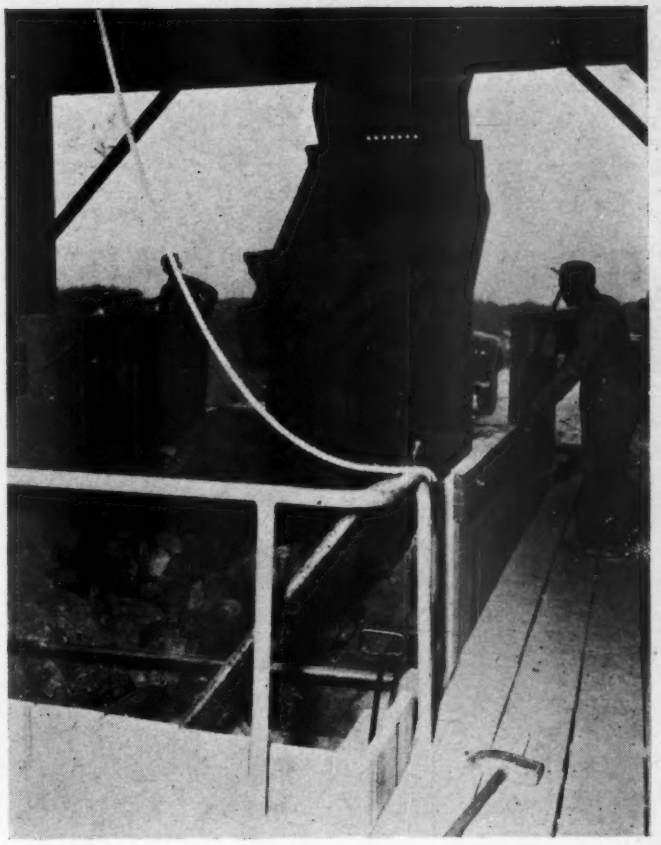
The stone is worked in 15-ft. ledges on about a 40-ft. face, and drilling is done with three Ingersoll-Rand wagon drills. About 40 holes are fired in a double-row shot. The size of the blasts is kept down in order to expose as little of the stone as possible to rain. For the past two years the company has used Rockmaster caps in order to avoid complaints and damage claims from nearby greenhouses. The switch to delay caps was found not only to reduce the jar incident to blasting, but also to increase breakage and virtually eliminate backbreak.

Wherever there is sufficient time the company caps its blast holes.



• A general view of the Hopkinsville Stone Company's plant at Hopkinsville, Ky.





with about 8 ft. of concrete grout, which is allowed to set from 12 to 24 hours before the holes are fired. This practice, in combination with the use of delay caps, is said to make the blasts almost indetectable, and in addition effects a considerable increase in dynamite efficiency. Although concreting is not a new development in connection with blasting, this is our first encounter with the practice in a stone quarry. A shovel mix, rather wet, is prepared in wheelbarrows right at the ledge, using No. 11 (minus ¼-in.) stone and regular portland cement. The grout is tamped lightly into the holes to make certain there are no voids. Its primary function seems to be to direct the force of the blast laterally and downward against the stone, in much the same fashion as mud capping in secondary blasting.

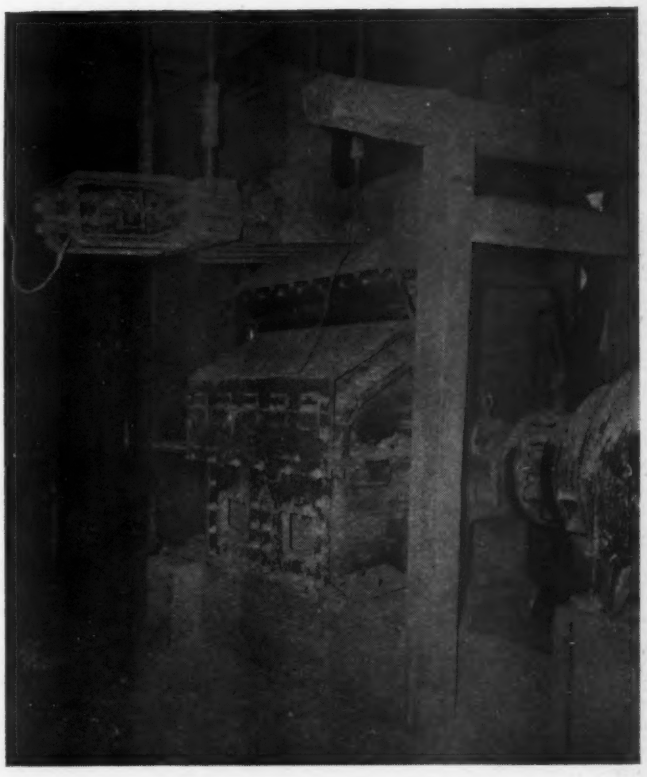
Some secondary shooting is still required, but the larger primary crusher has effected an important economy in this phase of the operation. Since the Traylor jaw was placed in service last winter, an 80 percent reduction has been noted in the amount of dynamite used for secondary blasting.

The increased capacity resulting from these changes will be divided among the various products of the plant. About a third of the company's business is now accounted for by the sale of agricultural limestone. Most of the remainder goes to the state, county and city highway departments, and to concrete block and ready-mixed concrete producers.

Christian County, in which the plant is located, is today one of the largest consumers of agricultural limestone in the country, and the history of the Hopkinsville plant has been marked by constant efforts to keep pace with the steadily increasing demand for this material. In 1936 the company installed its first pulverizer, a Jeffrey Type A-Z, 36- by 30-in. swing hammermill, and two years later a 36- by 36-in. machine of the same make was purchased. In 1939 a Symons 3-ft. short-head cone crusher was installed to provide a finer feed for the pulverizers, and with these facilities

(*Continued on page* 94)

• Above, left: the new 30-by 42-in. jaw crusher will take any rock that can be handled with a 1¼-yd. dipper. By thus increasing crusher capacity, secondary blasting has been reduced by 80 percent.
• Above, right: Quarry trucks dump directly from ramp onto a 48-in. by 12-ft. pan feeder.
• Below: Largest of the three swing hammermills which are used to produce agricultural limestone. The 42- by 48-in. machine when equipped with 3/16 in. bars, produces up to 70 t.p.h.



Utilizing Diesel—Power Equipment in Underground Mining*

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PART II

Other Diesel-Powered Equipment in American Mines

another P&Q exclusive

TRUCKS powered with gasoline or diesel engines are used extensively as haulage units in underground limestone and sandstone mines in the central states. The mines are usually in flat, or nearly flat, formations where it is possible to build roads without excessive grades. The mine workings vary greatly in height, ranging from 12 to 50 feet high; the overlying rock is supported by pillars, and usually there are several openings to the surface which provide fairly good ventilation. The cross-sectional area of most of these mine workings is so large that the exhaust gases from the internal-combustion engines are diluted relatively promptly and effectively, and the movement of the air inside the mine is sufficient to carry them away. Mechanical methods of ventilation are seldom used in these particular mines having adit openings; a few mines are opened with shafts, and these are ventilated much the same as a coal mine.

Diesel Trucks in a Shaft Mine

A limestone mine, which is opened by two shafts about 2,200 feet deep, is using six diesel-powered trucks of 6-cu. yd. capacity each for haulage units and a diesel-powered bulldozer for clean-up purposes. A 2-entry room-and-pillar method of mining is used to extract a 17-ft. approximately horizontal bed of limestone. The entries are driven 16 feet wide and 17 feet high; the rooms are advanced about 30 feet wide for a distance of 600 feet. On retreat, approximately 12 feet of additional top rock is mined, making the final room size about 30 feet wide and 29 feet high.

Ventilation is induced by a reversible fan operating blowing; about 66,000 cubic feet of air per minute is circulated through the mine in two splits. The haulageways are ventilated by return air when possible.

The trucks are powered by 2-cycle, 4-cyl. diesel engines with 4¼-in. bore and 5-in. stroke. The engines develop 107 hp. at 1,800 haulageways and in the vicinity of r.p.m. The trucks are fitted with a 3-speed transmission and a reverse gear which gives the trucks three speeds in either direction. The bulldozer develops a drawbar horsepower of 60.1, with a governed speed of 1,500 r.p.m.

A diesel tractor equipped to load material is an auxiliary rock-loading unit; a 1½-ton truck fitted with a 4-cycle, 4-cyl. engine is used as a service truck.

The large trucks are loaded by an electric shovel or by the diesel tractor and transport the limestone to the hoisting shaft; a round trip requires 7 to 10 minutes, and each truck makes 30 to 40 round trips a shift. The engines of the trucks are stopped while the trucks are being loaded.

Analyses of the samples of the general mine air taken in two working faces and in the main return at the shaft bottom where three diesel trucks had passed in the preceding 7 minutes are shown below:

Sample Location	Face of Room A	Face of Room B	Main Return at Shaft Bottom
Oxygen	20.92	20.72	20.92
Nitrogen	79.02	79.08	79.02
Carbon dioxide	.06	.16	.05
Carbon monoxide	.00	.00	.00
Methane	.00	.04	.03
Total	100.00	100.00	100.00

Some analyses of the exhaust gas taken from the large diesel trucks while idling and while working under varying loads follow:

	Truck Idling		Truck Working	
	Truck 2	Truck 5	Truck 2	Truck 5
Oxygen	19.67	19.85	16.87	11.55
Nitrogen	79.41	79.29	80.17	81.67
Carbon dioxide	.89	.80	2.93	6.68
Carbon monoxide	.03	.04	.03	.07
Methane	.00	.02	.00	.03
Total	100.00	100.00	100.00	100.00
Oxide of nitrogen, parts per million	64	13	175	46
Aldehydes, parts per million	30	40	?	?

The successful use of diesel-powered equipment at this time is significant. The mine shaft is about 2,200 feet deep, and ventilation of the working places is induced by mechanical means. The volume of fresh air taken into the mine is sufficient to dilute and carry away the toxic gases of the exhaust from the diesel engines, and the analyses of the samples of the general mine air indicate that the air in this mine is better than ordinarily found in mines notwithstanding the use of seven different units of diesel-powered equipment.

Diesel Equipment in a Mine with Adits

An underground limestone and shale mine in one of the central states is using internal-combustion engines as power units for most of the operations other than loading rock. The use of diesel-powered, portable air compressors and drill jumbos mounted on diesel caterpillar tractors is out of the ordinary. Three trucks used for haulage purposes are equipped with gasoline engines, and a fourth truck is diesel-powered.

The mine is opened by two adits and covers an area of approximately 80 acres. The overburden averages about 100 feet in thickness. The mining method consists of driving rooms about 38 feet wide between staggered pillars approximately 55 feet square. The rooms average 18 feet high; all mining in limestone is worked advancing. The shale that overlies the limestone is mined by blasting 18 feet of shale into the rooms where limestone mining is completed, or abandoned temporarily. The shale mining is worked on the retreat. Approximately 800 tons of rock are produced daily.

Mechanical methods of ventilation are not provided, but the natural ventilation is assisted by two concrete-lined shafts; one shaft is 14 feet in diameter and the other is 7 feet. Considerable air movement in the mine workings is induced by the piston-effect of the large trucks moving in the relatively

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narrow passageways. The air measurements taken indicate approximately 20,000 cubic feet of air per minute is circulating through the working sections of the mine.

Portable air compressors of 350- and 500-c.f.m. capacity and powered by diesel engines are used. Drill jumbos mounted on diesel-driven crawler tractors are moved from one working place to another as required; in moving, the diesel tractor pulls the portable air compressor to the new working place, and the compressor is left a convenient distance from the face, generally in a crosscut between two pillars.

Electric-powered shovels load the broken rock into 15-cu. yd capacity, 10-wheel diesel trucks which transport the rock to the crushing plant.

The general mine air along the the working places was sampled, using vacuum tubes and a supersensitive carbon monoxide indicator. The carbon monoxide concentration was not sufficient to be detected by the indicator, which accurately indicates as little as 0.001 percent. The analyses of these samples are shown below:

	About 150 Feet from 350-c.f.m. Portable Air Compressor	Near 500-c.f.m. Portable Air Compressor	At Face of Room-Electrical Shovel Operating
Oxygen	20.76	20.81	20.87
Nitrogen	79.08	79.07	79.03
Carbon dioxide	.01	.11	.09
Carbon monoxide	.00	Minus .01	Minus .01
Total	100.00	100.00	100.00
Oxides of nitrogen, parts per million	12	.....	.....

The use of diesel-powered portable air compressors underground is unusual, but in this case it appears to be satisfactory inasmuch as the analyses show the general mine air in the immediate vicinity of the operations is better than usually found in normal mine air. The use of this equipment could be made safer from possible concentrations of toxic gases if a portable fan were installed with the unit to insure dispersal of the exhaust gases and assist in the general air movement in the mine.

Gasoline Engines

The use of gasoline engines underground is considered hazardous by the Bureau of Mines; the gasoline-engine exhaust contains much more carbon monoxide than the exhaust from a diesel engine in normal working condition, and in addition the fire explosion hazards of gasoline are much greater than those of the less flammable fuel oil used in diesel engines. However, if a diesel engine is not maintained in proper working condition and the air:fuel ratio is not adjusted for underground service the exhaust gas may become as toxic as the exhaust from a gasoline engine.

Diesel Trucks in an Underground Limestone Mine

An important underground limestone mine in Pennsylvania changed its haulage system from steam-powered locomotive to diesel trucks on April 1, 1939. The mine delivers approximately 300 tons of limestone to the crushing plant daily.

The limestone bed is about 21 feet thick, 17 feet being mined, the remaining 4 feet being left as a roof. The rooms and entries are driven about 30 feet wide on 60-ft. centers. Pillars are not recovered.

Ventilation is by natural means; there are 12 adit openings to the mine, which provide for the normal ventilating requirements. Measurements taken along the haulageway show a movement of air of 33 linear feet a minute in a cross-sectional area of 561 square feet, or somewhat less than 19,000 cubic feet per minute.

The broken limestone is loaded by an electric shovel equipped with a tunnel-type boom and mounted on crawlers. The rock is loaded into tractor-trailer-type trucks and hauled to the crushing plant. The round trip is approximately 4¼ miles, of which 2½ miles are underground and 1¾ miles are on the surface.

The diesel truck engine is a 6-cyl. turbulence-controlled type; the cylinders have a bore of 3¾ inches and a 4½-in. stroke. The displacement is 298 cubic inches; the engine is rated 85 b.h.p. at 2,500 r.p.m. The exhaust from the engine is carried to the atmosphere through a pipe that extends from the engine to the top of the trailer, tending to keep the exhaust gas away from the driver of the truck. The engines are stopped while the trucks are being loaded. The diesel engines are overhauled at the factory after being used for 20,000 miles; the pistons, piston rings, and cylinder sleeves are renewed in the general reconditioning of the engines. Samples of the general mine air are analyzed at the bottom of the page.

Supersensitive carbon monoxide indicators were operated in the haulageway, at a working face, and in a caved area, but no carbon monoxide was detected by the indicator. The supersensitive carbon monoxide indicator when functioning will accurately determine carbon monoxide in the range of 0.01 to 0.001 percent and 0.0025 percent can be estimated.

The Industrial Board of the Commonwealth of Pennsylvania granted permission to the company to use diesel-powered trucks underground under specified conditions.

Underground Ventilation

The ventilation requirements for safe operation of diesel engines underground are of considerable importance and should be carefully considered before a diesel engine is permitted to operate in a mine, tunnel or other confined place.

Diesel engines, when in good mechanical condition and operating in normal air, give off noxious gases in the exhaust, and the quantities increase in amount with the brake horsepower of the engine. At full speed and maximum load, the tests made by the Bureau of Mines and others show the following amounts of noxious gases are produced per brake horsepower by a diesel engine.

Carbon dioxide	0.267 c.f.m.
Carbon monoxide	0.000592 c.f.m.
Oxides of nitrogen	4.001512 c.f.m.

On this basis it has been determined that approximately 75 cubic feet of air per minute per brake horsepower is required for each diesel engine operating underground; this is the minimum requirement and is additional to the normal ventilation supplied the working place if diesel engines are not employed. However, in some instances the ventilation provided is in excess of that required to maintain the mine atmosphere at the proper quality level; in these in-

	No. 15 Entry		Main Haulage Road	Face of Entry at Shovel
	1	2		
Oxygen	20.76%	20.79%	20.73%	20.90%
Nitrogen	79.04%	79.00%	79.21%	79.01%
Carbon dioxide	.21%	.21%	.06%	.08%
Carbon monoxide	.00%	.00%	.00%	Minus .01%
Methane	.00%	.00%	.00%	.00%

The oxides of nitrogen were not determined.

stances it may not be necessary to provide additional ventilation if diesel equipment is placed in operation. For example, if two 65-b.hp. diesel engines are to be installed, then 2 x 65 x 75 c.f.m. = 9,750 cubic feet of air per minute must be provided in excess of the minimum requirements. However, if an excess of, say, 50,000 cubic feet of air is provided in order to move the smoke from blasting or to dilute explosive gas as in a coal mine, no additional air is required for operating diesel engines underground.

Frequent analyses of the general mine air should be made in the working environments in which a diesel engine is operating; this is particularly important immediately after the diesel equipment is installed, since it will provide a check against the calculated quantity of air needed to avoid trouble.

Mining Laws for Underground Internal-Combustion Engines

The mining laws and regulations of some states prohibit the use of internal-combustion engines in underground mines; others have laws and regulations permitting their use provided that permission is obtained from the Department of Mines prior to their installation.

The laws and regulations prohibiting the underground use of internal-combustion engines are intended primarily to prevent the use of gasoline-powered mine locomotives and other equipment. These laws and regulations were placed in effect before the diesel engine was perfected to its present stage of safety and efficiency and it now appears that alterations should be made to allow of use of diesel equipment under certain prescribed conditions.

Hazards of Trolley Locomotives in Metal and Nonmetallic Mines

Diesel locomotives used in underground mines, like all kinds of equipment placed in mines, also bring hazards of their own which were not present before they were installed, but the chief additional hazard in the operation of diesel engines underground is the occurrence of toxic gases in the exhaust; these can be controlled and practically eliminated by using suitably-constructed and well-maintained diesel locomotives and by providing adequate ventilation and reasonable methods in the use of the equipment.

The trolley-locomotive system has inherent hazards that are not susceptible of control. Some of the principal hazards attending the use of the electric trolley locomotive are:

1. Contact of persons with bare trolley wire.
2. Contact of bare trolley wire with mine doors, timbering, roof, rib, and curtains (fire hazard).
3. Arcs or sparks from poor or broken bonding, bad joints or broken rails igniting coal, gas or timber ties.
4. Arcs or sparks from trolley wheel, harp, or shoe igniting combustible material, such as brattice cloth, wood, gas, dust or timbers, or in some cases explosives.
5. Arcs or sparks from locomotive controller or motor igniting gas or dust.
6. Arcs or sparks from locomotive wheels on poorly-bonded track.
7. Falls of roof bringing down trolley wire and touching cars or rails igniting coal, gas or timbers.
8. Wrecked or derailed cars causing coal dust to be thrown into suspension and ignited by arcs from the fallen trolley wire.
9. Explosion of Cardox shells, explosives, etc., through short circuits on trolley haulage trips or cars.
10. Stray currents from poorly-installed trolley systems causing premature detonation of electrically-fired explosives.

The problem of stray currents caused by trolley locomotives is very serious, and it is noteworthy that many large mines continue to use fuse-and-cap blasting rather than electric blasting because of the fear of stray currents caused by the electric haulage system. A few mines have abandoned the use of the trolley system because they desire to use electric blasting.

The hazard of exhaust gases from a diesel engine can be practically eliminated by ventilation of the mine workings, and none of the principal hazards of the electric trolley system is present when diesel haulage is used.

The trolley wires are a prolific cause of mine fires and of explosions in coal mines. Between 1930 and 1944, 30 mine fires and 50 explosions are known to have resulted from this cause and 355 workers lost their lives due to these occurrences. Fires and explosions from this cause may be largely if not wholly eliminated by using diesel locomotives, since European statistics indicate that no mine fires or explosions have been caused by diesel locomotives in coal mines.

Diesel Equipment for Safety in American Mines

Diesel engines of suitable construction can be used safely in underground mines if adequate ventilation is provided and the diesel equipment is kept in reasonably good repair. The ventilation should be induced mechanically so that the circulation of the air can be controlled at all times. The atmosphere in which a diesel engine works should be essentially normal air; otherwise trouble is virtually certain to be experienced.

Mine officials who are responsible for the health and safety of the mine workers should have a thorough understanding of the disadvantages as well as the advantages of using diesel equipment underground. The plan of ventilation should be worked out before the units are installed, and samples of the mine air should be analyzed at frequent intervals after the diesels are first operated underground; the object of this procedure is to check the effectiveness of the ventilation. Periodic analyses of the mine air, particularly along the haulageways, should be made while the diesels continue in operation, to check the mechanical conditions of the diesel engines as well as the quality and, to some extent, the quantity of the air.

The diesel mine locomotive is less hazardous in underground operation than one of the electric-trolley type. A study of American coal-mine statistics reveals that 783 fatalities were caused by electric-trolley systems in underground mines in the period 1930-44, while European statistics show no fatalities caused by the use of diesel locomotives in underground coal mines.

The diesel mine locomotive is preferable to the storage-battery locomotive, particularly when heavy loads and steep grades are considered. The original cost of equipment and the cost of maintenance definitely favor the diesel insofar as now known.

However, it should be emphasized that the diesel engine should not be used in any type of underground mine or in any confined place unless adequate ventilation is provided. If this is done, the diesel engine can be adopted with safety in underground mines and it has numerous efficiency advantages over the conventional haulage procedures of the present day.

Versatile Agstone Plant

(*From page* 66)

possible future installation of dry-kiln for lime production. The plant is served by a 44,000-volt main line Georgia Power Co. circuit, and the present facilities represent a connected load somewhat in excess of 500 hp.

Officials of Armena Lime Mine & Farms are Dermot Shemwell Sr., president; Dermot Shemwell Jr., vice-president and treasurer; E. R. Culbertson, vice-president in charge of sales; Wade C. Moody, vice-president, and Susie E. Tolbert, secretary. B. J. Ratti is plant superintendent.

• The 1½- cu. yd. slackline cableway which spans the Bow River and digs, conveys and elevates sand and gravel for Jeffries & Sons, Inc., at Calgary, Alta., Canada.

Canadian Firm Employs Slackline Cableway for Excavating Aggregate*

THE Canadian firm of Jeffries & Sons, Ltd., of Calgary, Alberta, now uses a Sauerman slackline cableway for excavating sand and gravel, and also for delivering the material to the top of its gravity-fed washing and screening plant. The cableway digs from the Bow River, and the aggregate brought in feeds the entire plant.

Prior to the installation of the cableway in 1941, Jeffries had been using a drag scraper to excavate. Because of the nature of the digging, it was decided to make a change. After consulting with Sauerman engineers, the cableway was installed, and has been operating successfully ever since.

The river bed from which the material is taken consists of very hard packed sand and stone, and the deposit varies from 10 to 25 feet in depth; the stone brought in runs as large as 12 inches, and there is only a very minor percentage of sand.

At the digging point, the material lies in a river bar approximately 700 to 1,000 feet wide and 1,200 feet long. Six hundred feet of the bar is 2 feet above water, except in the month of June, when almost all is covered.

At the point of erection of the cableway, the mast is a distance of 700 feet from the tail anchor on the other side of the river. A series of concrete anchor blocks are embedded at 100 ft. intervals in the far river bank, and, as a result, the span of the machine varies from the 700 ft. distance to 875 feet. A shift is made between tail anchors about once a month, this lateral shifting of the cableway's line of operation being sufficiently frequent to keep it working into material at all times.

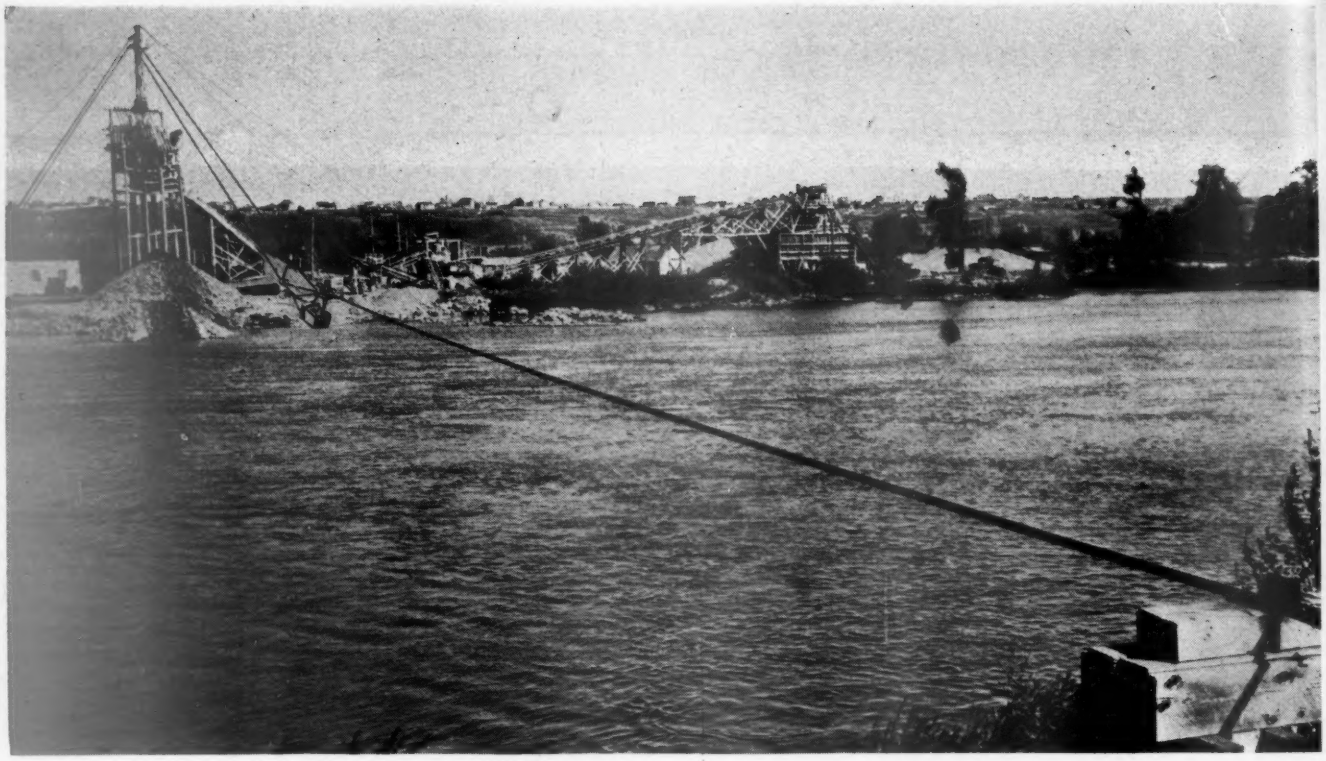
Plant requirements are 40 cubic yards per hour. To meet this capacity demand, a 1½-cubic yard cableway excavator was chosen. The steel head mast stands 90 feet high, being held by 6 guys, and the 35-cu. yd. hopper into which the cableway dumps is 50 feet high. With this height of mast, the gravity return of the empty bucket will reach practically all the material in the bar. The track cable is 1¾-in. Special Excavator cable.

The original hoist which Jeffries had used with this drag scraper could not develop the high inhaul speeds which make slackline cableway operation so economical. In 1946, therefore, the company purchased a new Sauerman roller bearing cableway hoist.

The new hoist moves the excavator bucket in at 200 feet per minute while digging, permitting it to pick up its load quickly. After clearing the water, the hoist is shifted to a higher speed, and the load is moved to the high dumping point at 600 feet per minute. A 100-hp. wound rotor induction motor drives the hoist. The operator's platform has face-forward levers,

• The operator is comfortably housed with his simple lever controls.

*Reprinted from the Sauerman Field Report.



• Across the 700-ft. span, the excavator can be seen approaching the plant. The material is brought up to the 90-ft. steel mast and the high hopper, from which it passes to the plant for final processing.

and is so located that the operator in the hoist house has clear vision at all times. The operator is paid $1.00 per hour, and power costs 1.3¢ per kilowatt-hour.

The plant is laid out for a maximum of operating economy. From the hopper and grizzly, the material falls to an automatic feeder and is conveyed on a 75 ft. conveyor belt to a double-deck vibrating screen. Oversize passes to a jaw crusher. From the second deck, the material moves to a roll crusher, and is returned by a 50-ft. conveyor to the main belt for rescreening.

After rescreening, a 200-ft. belt conveyor carries the sand and gravel to a triple-deck vibrating screen for final screening and washing. As mentioned before, there is very little silt in the material. About 50 percent crushing of limestone boulders is required.

The company turns out about 300 cubic yards of 1½-in. gravel per day, supplying all the general contractors in the Calgary area, who, in turn, use it widely for concrete work. Jeffries can, of course, crush to any desired sizes, these depending upon the size of screens used. An ample supply is on hand at all times in bins and on 2 acres of stockpiles.

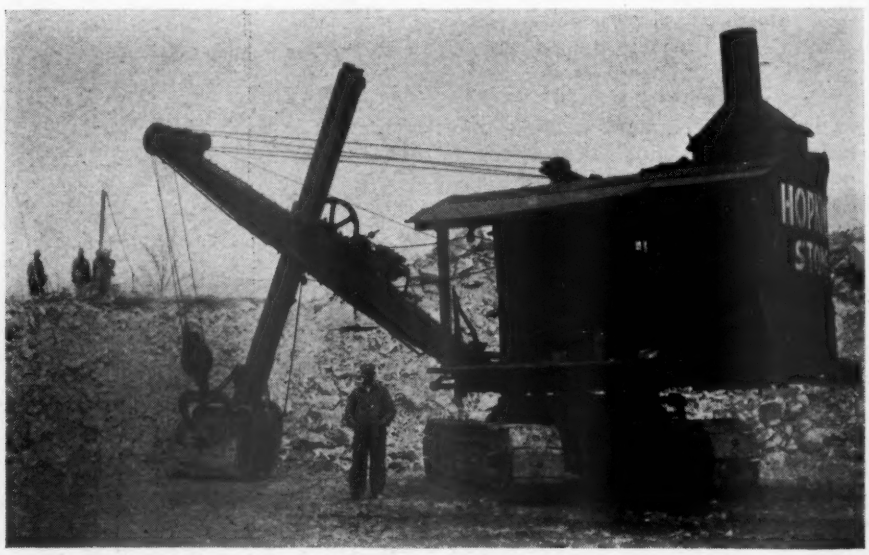
Larger Primary Crusher

(*From page* 87)

the company's output of agstone soared to more than 96,000 tons in 1941.

For the next three years output fell somewhat below this figure due to the large quantities of crushed stone which the company was required to furnish for a nearby army camp, but by 1945 the demand for agstone was again on the way up. March of that year saw the installation of a third pulverizer, a Jeffrey Type B-3, 42- by 48-in. mill which produces at the rate of 70 t.p.h. with 3/16-in. bars. With the three pulverizers the plant was equipped to reduce its entire output (close to 900 tons per day) to aglime. All three machines have Jeffrey-Traylor vibrating feeders.

The new primary crusher setup alone represents an investment of about $70,000—an amount which not many years ago might have covered the entire capital outlay on a small crushing plant. D. B. Bostick, a local construction engineer, designed the layout and supervised its construction.



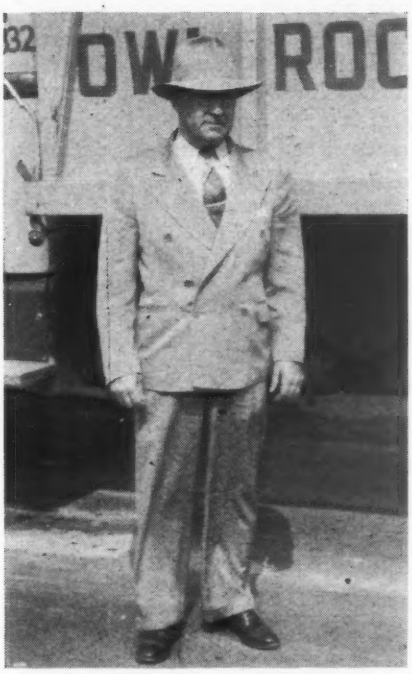
• This company still uses steam shovels, finds them economical and quite dependable. Availability of low-priced coal is an important factor.

Owl Rock Products Company Completes Rebuilding Program

• D. H. Burden, president, Owl Rock Products Co.

another ON THE SPOT report

THE San Gabriel Valley east of Los Angeles is the major source of aggregate supply for the metropolitan area. Nearly a dozen plants large and small, operate in the deep gravel deposits which extend over an area roughly 12 miles long and 6 miles wide, where well-graded material was laid down in past centuries by repeated overflows of the San Gabriel River.



One of the important producers here is the Owl Rock Products Co., an affiliate of the Owl Truck & Construction Co., of Compton, Calif. The company has been producing in the area for 25 years or so. Its original plant was located along Arrow Highway in Monrovia, directly opposite the present plant, which was erected and began operation in 1936. Last year an extensive program of rebuilding was begun and completed in the late spring of 1948.

Besides attaining the chief goal of increased production—the rebuilt plant has a capacity of 350 t.p.h., about 30 percent greater than formerly—the modernized flow-sheet and new equipment have greatly improved operating efficiency and lowered production costs. A new system of intraplant delivery was installed, together with a surge pile to permit the processing plant to operate independently of pit operations; additional screening and crushing capacity was installed; and the general layout was revamped considerably in the interest of flexibility.

• Left: H. N. Goodreau, manager, is a veteran of the Owl Organization, and with 21 years' continuous service.

• Below: The newly-modernized plant of the Owl Rock Products Co., at Compton, Calif.

The Owl deposit encompasses 35 acres, about 20 acres of which are as yet untouched. No stripping is required. Formerly a shovel loaded the material to a system of field conveyors running directly to the plant. In the new setup, two 13-ton bottom-dump Euclids are loaded by a new 2½-cu. yd. Manitowoc air-controlled diesel-powered Speedshovel. After a 600-ft. haul, these units discharge their loads into a 40-ton concrete bin feeding a Cedar Rapids 25- by 40-in. primary jaw-crusher. The crusher is driven by a 100-hp. Westinghouse motor and its jaws set to break at approximately 6 in., the product being put on conveyor No. 1 by a 36-in. divided, reciprocating feeder built by the Conveyor Co.

Conveyor No. 1, 30-in. wide and 370 ft. on centers, carries the 6-in.-minus material to a 55,000-ton surge storage pile, the point of discharge being 82 ft. above the tunnel house. The surge pile has a live storage capacity of about 20,000 tons—enough to supply the plant for about

• One of the 13-cu. yd. units discharging to the feed hopper over the primary crusher. The conveyor to the surge pile may be seen at the lower right.

six working days should pit operations be halted or the primary crusher be down.

Conveyor No. 2 recovers the material from the surge pile and delivers to the plant. The belt is 24 in. wide and 265 ft. on centers and operates in the 8- by 8-ft. concrete reclaiming tunnel for 100 ft. of its run, inclining upward as it emerges. Another reciprocating feeder lays the rock on the belt, the rate of feed being variable and regulated from the operating floor of the plant. Incidentally, push-button switches for all equipment are centralized on an Allen - Bradley control board on the plant operating floor.

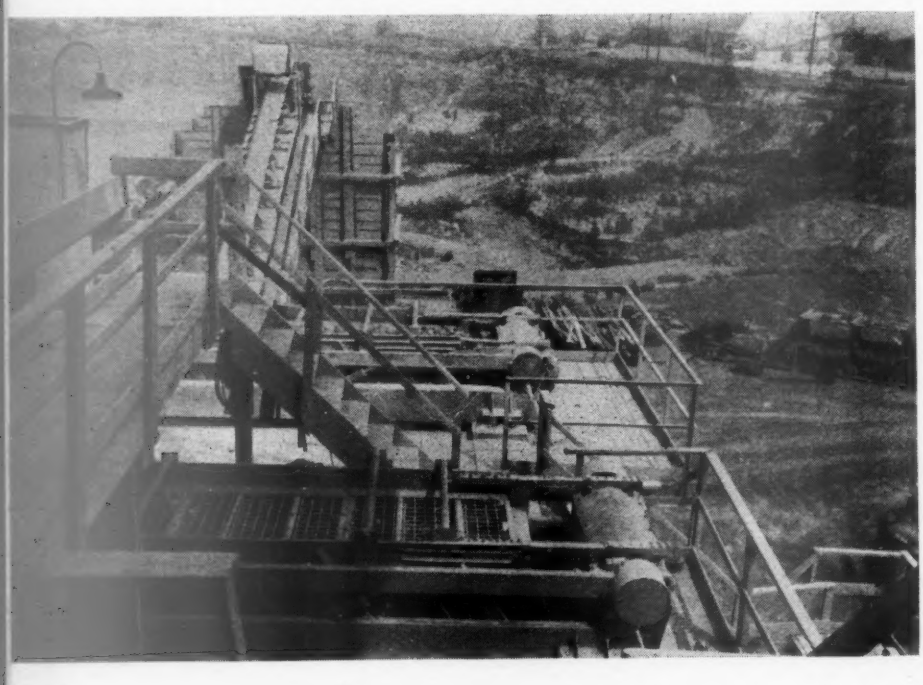
Delivery from conveyor No. 2 is to a Symons 4- by 12-ft. horizontal double - deck screen carrying 2½-in. cloth on the top and, optionally, 1⅝- or 1⅛-in. on the bottom deck. Oversize scalped off the top is chuted to a Traylor 3-ft. Type TY reduction crusher, set to break the 2½- to 6-in. rock down to 2 in. and smaller. Lower-deck rejects pass to either (or both) of two Symons cone crushers, a 3-ft. standard and a 4-ft. short-head model. The sand and gravel throughs from the screen pass on up to the washing-and-sizing equipment via a 60-ft. belt-bucket elevator.

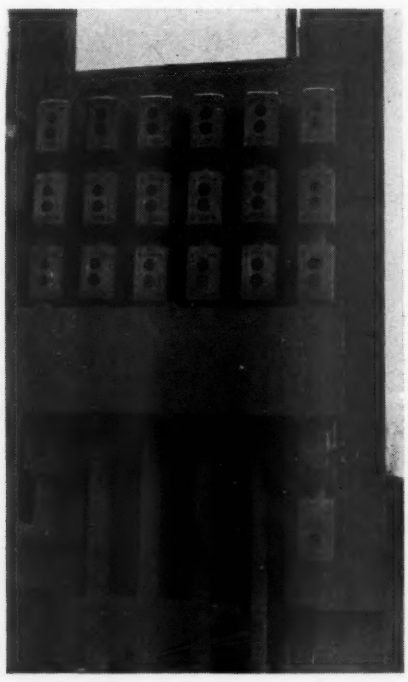
The products of all three crushers are combined and, merely to gain elevation, are carried by a pair of reverse inclined belt conveyors to a Symons 4- by 14-ft. 2-deck primary sizing screen. This screen also operates horizontally and is arranged alongside the scalper. Rejects from the 1⅝-in. top deck are returned to the cones below for recrushing while that retained on the lower-deck (13/16-in. mesh) may, at option, also go to the cones or may join the throughs for elevation to the rock-sizing screens. Transportation to the sizing screens is accomplished by another belt-bucket elevator identical to the one carrying the sand and gravel and operating parallel to it.

The primary screening-and-crushing operations mentioned above take place in a compact circuit, the equipment being placed from ground level to a height of about 30 ft., whereas the screens and washers in the classifying tower are 60 ft. or so above ground level. This was done to avoid the return of any rejects for recrushing from the screens which classify the finished products. Once the materials enter the boots of the two elevators, the top sizes are the maximum sizes desired and further reduction is neither necessary nor possible. Thus, long circulating loads are avoided.

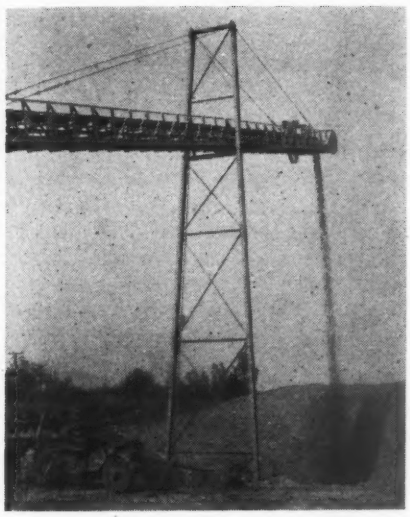
Material coming up the "gravel" (uncrushed) and "rock" (crushed) elevators is still dry. The crushed material is not washed at any stage of processing (a practice typical of most plants in the Los Angeles area) and classification is accomplished on a pair of screens arranged in series. The first, a 4- by 12-ft. Kennedy-Van Saun unit, makes 1⅛- and 13/16-in. crushed rock, throughs being classified into ⅜-, 5/16-, and 3/32-in. sizes by a 4- by 12-ft. Symons triple-deck screen. The minus 3/32-in. crushed fines are

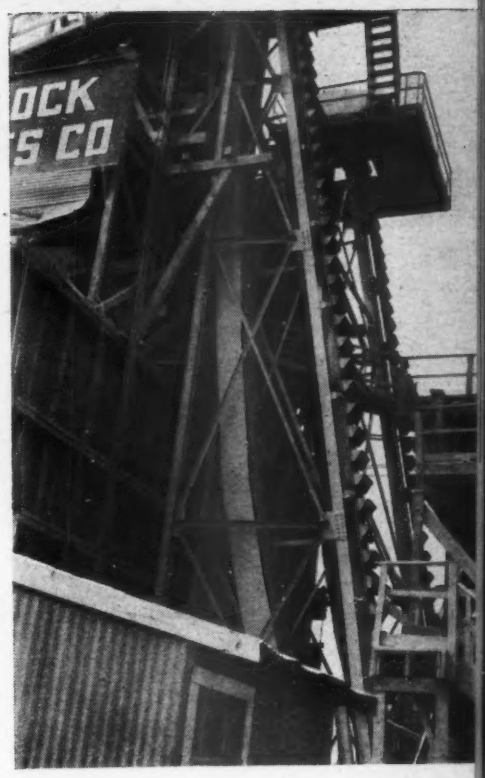
• Two of the vibrating screens on the crushed-rock side.





• The push button master control board on the operating floor.





• One of the new truck and trailer units being loaded by the stock-pile crane.

• Right: The crushed and uncrushed material elevators running up to the screening tower rise 70 ft. and 60 ft., respectively.

• Left: The conveyor from the primary crusher to the surge storage pile discharges at a height of 82 ft.

classed as dust and are further separated into "fine dust" and "coarse dust" by a 3/32-in. inclined screen. The finest material is widely used by concrete-block plants, while both sizes of dust are in demand by asphalt plants.

Sand and gravel coming off the second elevator discharge into a hopper where water is introduced under pressure to saturate and sluice the material to either or both of two Symons triple-deck screens. The screens, 4- by 14-ft. and 42-in. by 16-ft. units, are fitted with sprays for through washing of the products, rejects on the various decks dropping to the proper compartments of the truck-loading bins below. The throughs are the sands (concrete and plaster sand), alternate sizing being accomplished by changing the bottom-deck panels with dewatering taking place in a pair of 30-in. by 18-ft. drags. Sands may be spouted to bin compartments or may be carried to open storage by a 20-in. by 150-ft. stacker conveyor.

The truck-loading bins are divided into ten compartments and have a combined capacity of 600 tons.

A separate 24-in. by 125-ft. conveyor and a 200-ton bin have recently been installed for combining and loading out crusher-run material for pavement base-course work. Specifications for this material vary considerably and the required proportions for any particular job are fed onto the belt in the crushing department by controlling the gate openings in the feed chutes.

Power is purchased from the Southern California Edison Co. and is stepped down by transformers at the plant. Water for washing is supplied at 800 g.p.m. through an 8-in. pipeline to the plant by a 40-hp. Wintroath pump. The well goes down 200 ft. with water encountered at the 65-ft. level much of the time. Three cranes—a Northwest, a P&H No. 400, and a Standard—do clean-up, rehandling and loading from stockpiles.

About 60 percent of the output is delivered by the company's own trucks and the fleet has recently been modernized by the addition of 12 new 21-ton tractor-trailer units. Nine of these are International K-11 and three are White tractors which pull bodies and telescopic trailers supplied by Fruehauf and Cook Bros.

The company also produces decomposed granite from a pit and plant situated near Montebello, Calif.

D. H. Burden is president; Jerry Frerks, secretary; H. N. Goodreau, manager; "Bud" Peterson, plant superintendent, and W. M. Charles, transportation supervisor.

Phosphate Production Climbs To New Level in 1947

Both the quantity and value of the marketed production of Western states' phosphate rock skyrocketed to new levels in 1947, according to reports from the producers to the U.S. Bureau of Mines. Marketed production jumped from 492,602 long tons in 1946 to 1,193,288 tons in 1947, an increase of 142 percent. The value also more than doubled—rising from $3,012,157 in 1946 to $6,762,630 in 1947. The output in 1947 came from Idaho, Montana, Utah, and Wyoming.

Idaho, in 1947, with a marketed production of 905,214 long tons, nearly tripled its previous record of 312,658 tons, made in 1946, retaining its position as the leading producing state of the western region.

The marketed production of phosphate rock in Montana in 1947 was 236,229 long tons, an increase of more than 50,000 tons over its 1946 figure (179,944 tons). Wyoming became an important phosphate-rock producer in 1947, shipping a total of 51,845 long tons from the southwestern part of the state.

Family Partnership Operates Crushing, Ready-Mix Plants

Mr. and Mrs. A. W. Hytinen are partners in a business which includes both a crushed-stone and sand plant and a ready-mixed concrete plant. The latter operation was set up this spring at Mohler, Ore., and the ready-mix plant is located at Seaside, Ore.

At Mohler river deposit is recovered with a dragline. Capacity is 750 tons of sand and 300 tons of crushed rock daily.

the plant operator

by WOLF G. BAUER
Consulting Engineer

DRYING PROBLEMS IN THE LIME AND ALLIED MINERAL INDUSTRIES
PART II. DRYING SYSTEMS

another P and Q exclusive

IN order to treat the subject of drying systems in a thorough manner, it will be necessary to consider the various forms as they may apply to the many mineral industries, as well as those peculiar to the lime industry itself. In this discussion series on drying, the treatment has been kept semi-technical for the good reason that design and drying problems are anything but simple and easy to understand, and their presentation and discussion may confuse rather than enlighten the plant operator on the basic issues.

Components of Drying Systems Every "adiabatic"* convection-type drying system will include the following stages and phases which may or may not be separate units or distinct steps in the complete drying cycle or process.

A. Gas Phase
   1. Heat production stage
   2. Heat transfer to air or gas stage
   3. Heat transfer air to material stage
   4. Vapor removal stage
   5. Recirculation stage
   6. Heat—humidity—gas volume control phase

B. Solid Phase
   1. Material feeding control
   2. Material transportation, agitation, dispersion, attrition stage
   3. Material recirculation or conditioning stage
   4. Material collection stage

*In removing surface or unbound moisture by convection, the sensible heat in the drying air is changed to latent vaporizing heat, however, the total heat in the vapor-air system remains unchanged,—hence "adiabatic".

Each of these phases and stages bears discussion, but since the specific technique of application varies with the system, as well as the material characteristics, a preliminary treatment of the various systems themselves is made to precede the discussion on the components.

Materials Classification The number of materials and substances on the drying list are legion. To appear accurate and specific, a long classification list would have to be presented in order to include and account for all the many chemical and physical properties requiring special drying treatment. This is not really necessary here, and the following classification may cover most of the materials and minerals requiring moisture removal in the lime and nonmetallic minerals industry.

Primary Wet Material Classification

A. Hard and coarse sized material (usually low moisture)
B. Sand to dust-size material of low moisture
C. Sticky and plastic high-moisture materials
D. Non-adhesive, high-moisture materials
E. High-moisture fluid-suspended materials

Humerous subdivisions can be made under each of these headings, dealing with other chemical and physical properties of the material, such as sensitivity to certain temperatures, absorption and chemical reaction with heating gases containing products of combustion gases such as sulphur and carbon dioxide, sensitivity to sudden thermal shock, attrition, dusting, explosion or combustion tendencies, etc.

Drying System Classification The writer has attempted to classify the various dryers and systems into five primary groups. The distinctions are primarily in the method or technique of applying the heat or drying gases to the material, and in the manner of handling the material during the drying process in relation to these drying gases.

The following classifications are illustrated:

I. Agitated-Bed Surface-Contact Convection Dryers
   a. Parallel-flow rotary dryer
   b. Counter-flow rotary dryer
   c. Reversed-flow rotary dryer
   d. Indirect-direct-heat rotary dryer
   e. Screw and paddle counter-flow dryer
   f. Rotating-case screw dryer
   g. Rabbled-deck dryer

II. Static-Bed Surface-Contact Convection Dryers
   a. Belt or pan-conveying dryer
   b. Tunnel car dryer

III. Indirect-Heat Dryers
   a. Shell-heated rotary dryer
   b. Steam-tube rotary dryer
   c. Hot gas duct rotary dryer
   d. Internally-heated scraped-drum dryers
   e. Hot-jacket screw conveyor dryer

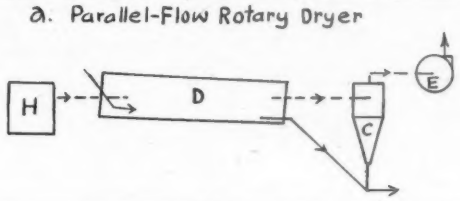
IV. Through-Bed Convection Dryers
   a. Solid bed up-flow dryer
   b. Solid bed cross-flow dryer
   c. Fluid bed cross-flow dryer
   d. Vibrating screen down-flow dryer
   e. Vibrating louvre cross-flow dryer
   f. Static bed screen belt dryer
   g. Louvre type rotating dryer

SCHEMATIC ILLUSTRATIONS OF FIVE DRYING SYSTEMS (BAUER)

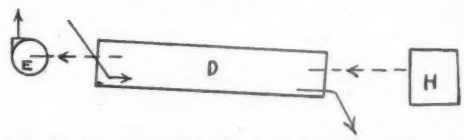
LEGEND: H..... = HEATER (CLEAN AIR OR MIXED GASES)
D..... = DRYER. E.... = EXHAUSTER
C..... = MATERIAL COLLECTOR
⟶ = MATERIAL FLOW. V... = VAPOR FAN
- - -→ = HOT GAS FLOW

I. AGITATED-BED SURFACE-CONTACT CONVECTION DRYERS

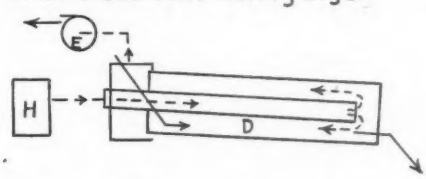
a. Parallel-Flow Rotary Dryer



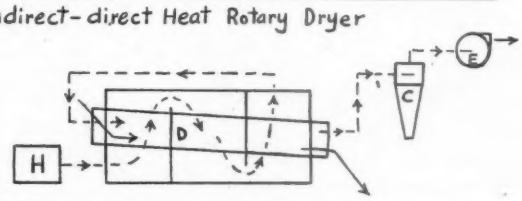
b. Counter-Flow Rotary Dryer



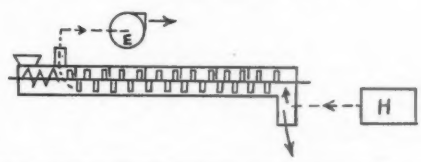
c. Reversed-Flow Rotary Dryer



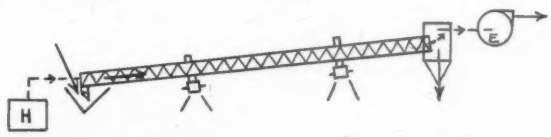
d. Indirect-direct Heat Rotary Dryer



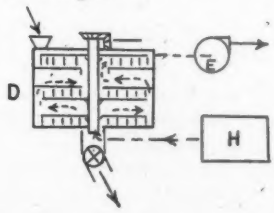
e. Screw & Paddle Counter-Flow Dryer



f. Rotating-Case Screw Dryer

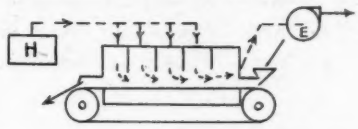


g. Rabbled-Deck Dryer

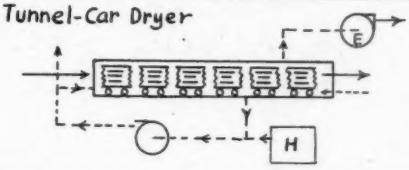


II. STATIC-BED SURFACE-CONTACT CONVECTION DRYERS

a. Belt or Pan Conveying Dryer

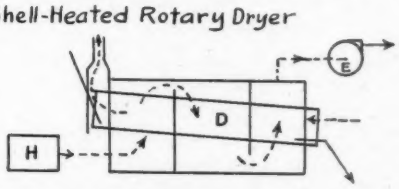


b. Tunnel-Car Dryer

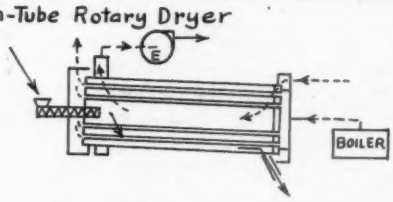


III. INDIRECT-HEAT DRYERS

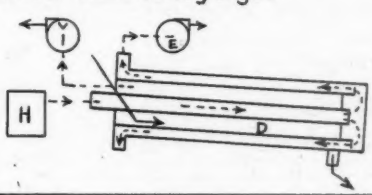
a. Shell-Heated Rotary Dryer



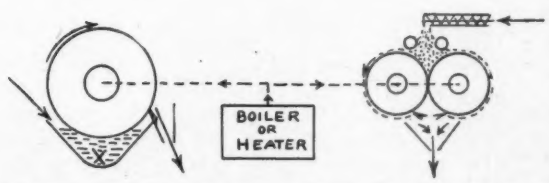
b. Steam-Tube Rotary Dryer



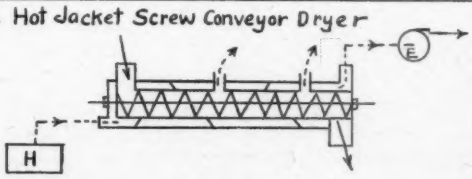
c. Hot-Gas Duct Rotary Dryer

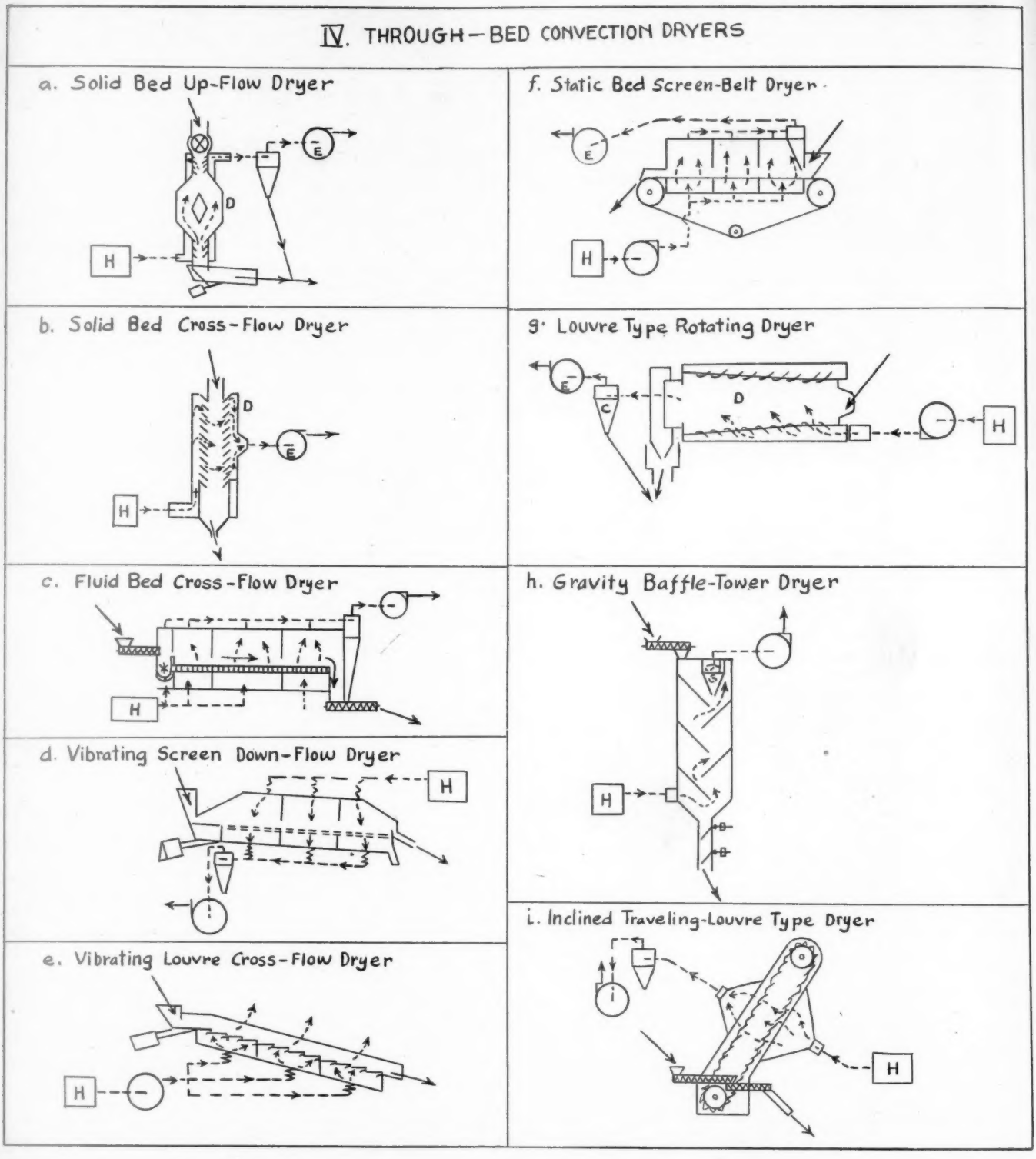


d. Internally Heated Scraped-Drum Dryers



e. Hot Jacket Screw Conveyor Dryer





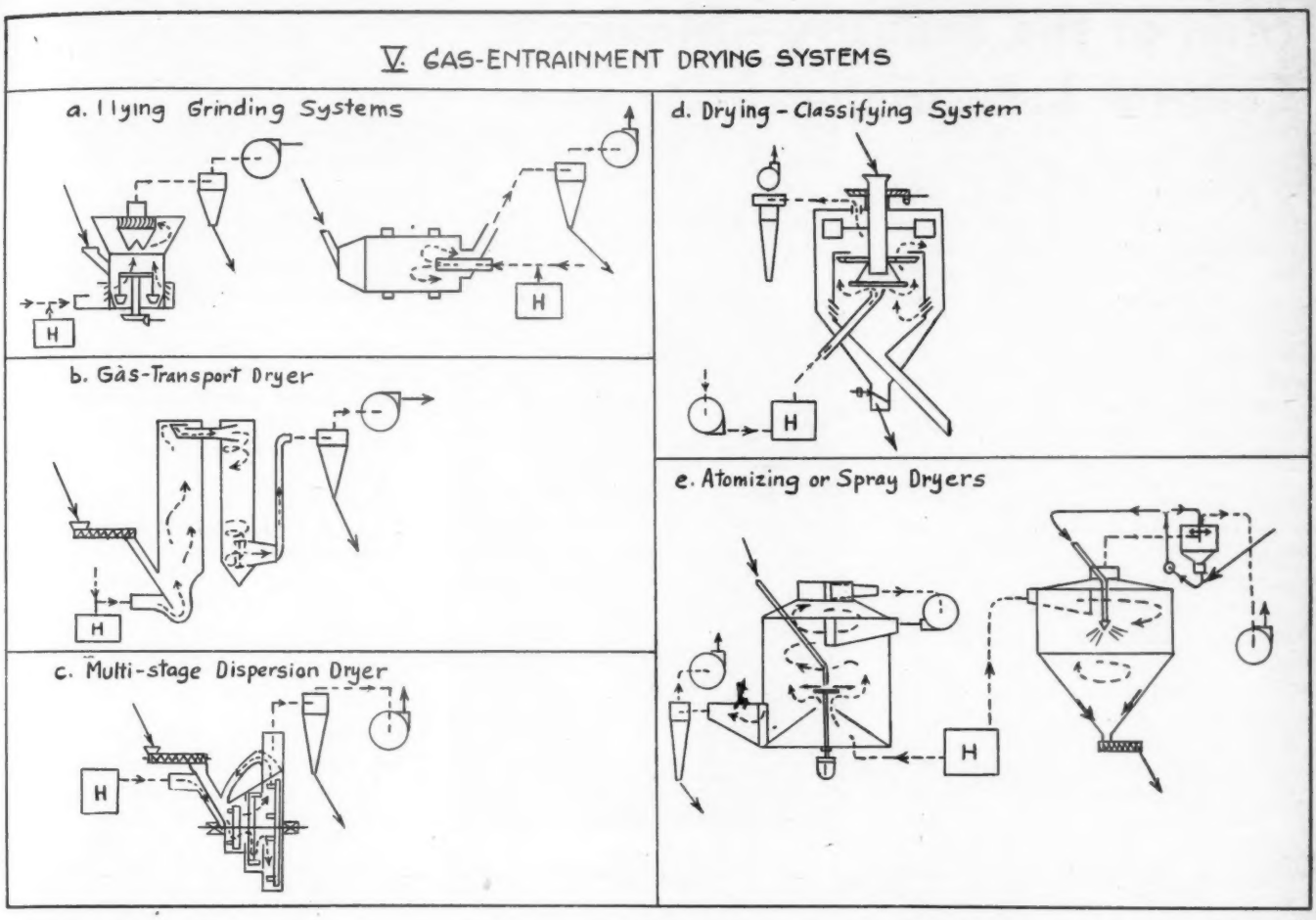
h. Gravity baffle tower dryer
i. Inclined traveling louvre-type dryer.

V. Gas-Entrainment Drying Systems
a. Drying—grinding systems
b. Gas transport dryer
c. Single or multistage dispersion dryer
d. Drying—classifying system
e. Atomizing or spray dryers

Aside from these dryers and systems, drying is also accomplished directly by radiation. In these methods, radiant energy may be derived from the high-temperature visible red spectrum, from the longer infra-red, and from the high-frequency sources. Since radiant heating is not generally applied to nonmetallic natural minerals, the interested reader is referred to many of the excellent treatises available on these subjects.

In studying the schematic illustrations of the common, as well as the not-so-familar convection-type drying systems, the reader will, no doubt, sense certain advantages as well as restrictive limitations of each, and application possibilities to his own peculiar materials and conditions. These material and dryer relationships and inter-adaptations will constitute Part III of this series on drying practices.

Three veteran employees—R. R. Miller (Cincinnati) and B. B. McAlister (Chattanooga, Tenn.) each with 20 years' of service, and W. T. Streicher (Cincinnati) with a 15-year service record, were honored on June 21 at a testimonial dinner given by the Minnesota Mining & Mfg. Co. Mr. Miller and Mr. Streicher are sales managers in Cincinnati, and Mr. McAlister is salesman for the Southern area.



Marquette's New Towboat Christened at C. Girardeau

Much favorable comment has been heard on the neat appearance and excellent performance of the new diesel vessel *John Luchow*, owned and operated by the Marquette Cement Manufacturing Company. While her early service was as a harbor tug at Cape Girardeau, Mo., she will be used by the company also in up- and down-river towing of cement.

The boat was built by the Jeffersonville (Ind.) Boat & Machine Co. She is welded steel from stem to stern, 70 by 18 ft. in hull size, powered by a 250-hp. diesel Enterprise engine. Attending recent christening ceremonies at Cape Girardeau were Marquette's president, Walter A. Wecker of Chicago, with William E. Erwin, manager of industrial relations, and Jack K. White, director of public relations, The boat was named for Capt. John Luchow, Marquette's marine superintendent. Mrs. Luchow had the honor of christening the craft.

Acquisition of the *John Luchow* will facilitate Marquette's operations in handling barge trains of coal and cement on the Mississippi and Illinois rivers.

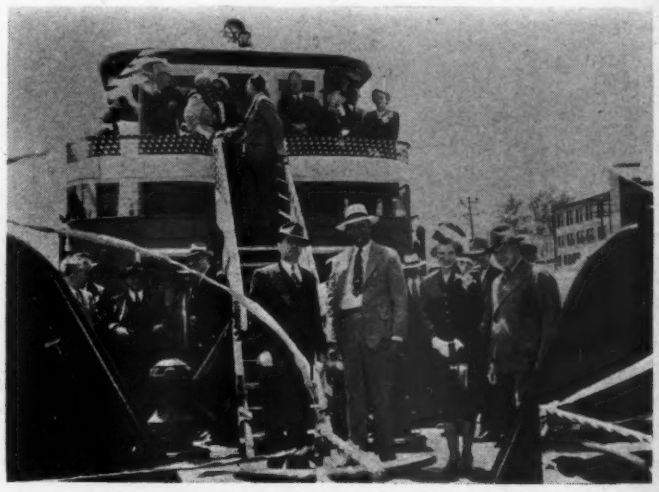
3,500 Fed and Entertained At Mammoth Family Party

More than 3,500 persons attended the free barbecue dinner given by officials of the Consolidated Rock Products Company at the Irwindale, Calif., plant on June 12. The barbecue is an annual event.

It was estimated that about 2,600 pounds of meat, 2,012 ice cream bars and 11,250 bottles of beverage, were consumed. Barrels of frijoles and potato salad disappeared, and other potables and eatables were provided on a similar scale. Competitive events and dancing furnished entertainment for all guests—employees of the plant and their families and friends.

Robert Mitchell, Consolidated president, R. C. Griffin, production manager, Floyd Erickson, sales manager (all of Los Angeles) and Frank Carroll, plant superintendent, were among the officials who enjoyed the festivities.

• Below: The "John Luchow," Marquette's new towboat, takes to the Mississippi.
• Right: A group at the vessel's christening rites: V. A. Kogge, transportation manager, Capt. John Luchow, marine superintendent, Mrs. Luchow and W. A. Wecker, Marquette's president.



Men of the Industry—Mexico's Colorful Industrialist-Statesman

DON Antonio Ruiz Galindo, Mexico's colorful Secretary of National Economy, lime producer and business leader, epitomizes the new class of industrialist-statesman. He, and the men like him, who now direct the state affairs of our neighbor below the Rio Grande are all successful free-enterprisers. They believe that the future of Mexico lies in their ability to promote heavy industrialization. Only through industrialization, they assert, can the working classes be emancipated.

Long before the Mexican government passed enlightened labor legislation, industrialists like Sr. Ruiz Galindo had eliminated serf-like working conditions in their own plants. Their laborers were better paid, worked shorter hours, and enjoyed more privileges, not because these men were philanthropists, but because it was good business for them and for Mexico.

Don Antonio Ruiz Galindo was born in Cordoba, Veracruz, July 30, 1897, the son of Don Antonio Ruiz Cano and Dona Margarita Galindo de Ruiz. When he was 16, he joined the revolutionary forces and for four years served his country in uniform. By 1920 he owned his own mercantile company, but because of his public protests against the policies of President Carranza he was forced to give up this business and flee for his life. After three years of exile he returned to his native state and went to work for the General Fireproofing Co., importers of steel furniture.

In 1929 he founded the Distribuidora Mexicana, S. A., on 10,000 pesos (about $2,500) borrowed against a mortgage on the family home. This

Don Antonio Ruiz Galindo

modest venture marked the beginning of a great commercial empire. Through the Distribuidora Mexicana, Sr. Galindo now controls and directs the largest steel furniture factory in Latin America, the Cal Hidratada Veracruzana (this new lime plant at Fortin was described in PIT AND QUARRY, August, 1947), the Bank of Veracruz, and the magnificent Hotel Ruiz Galindo, Fortin de los Flores, a luxurious resort in a tropical setting and one of the truly great show places in all Mexico.

The multimillion-dollar furniture factory located in the Ciudad Industrial "D. M. Nacional" is said to be the only privately-owned project of its kind anywhere. Besides the modern factory, the project includes a model village designed to care for all the needs of the plant workers and their families. The 450,000-square-meter city includes schools, theaters, gymnasiums, homes, libraries, and hospitals.

Today at 51, Sr. Galindo, member of President Miguel Aleman's cabinet, owner of the sprawling Distribuidora Mexicana, finds time to serve as honorary president of the Interamerican Hotel Association and vice-president of the Confederation of Industrial Congress. Yes, Don Antonio Ruiz Galindo, free-enterpriser, is a man whose energies and sizeable personal fortune are directed toward the economic liberation of the Mexican peons.

• The gardenia-strewn swimming pool, one of the many attractions at the magnificent Hotel Ruiz Galindo.

Towboat Lives up to Her Name On Upper Ohio River Run

The diesel vessel *Paragon* of the Ohio Valley Sand Company, New Martinsville, West Va., uses a two-shift crew and has been extremely busy towing to the company landing opposite Hannibal, O. This boat has a name for good pushing among the river folks on the upper Ohio. She is a neat wood hull sternwheeler, built at the Thomas boatyard in Clarington, O., nearly 20 years ago. The dimensions are 67 ft. long, 16 ft. beam, with a depth of 2.1 feet. The power is provided by a Fairbanks-Morse engine, rated at 100 hp.

Pacific Coast Aggregates Opens New Centerville Plant

Pacific Coast Aggregates Company, which has been operating at a site near Niles, Calif., for more than 35 years, closed that plant and opened full-scale excavation at its new location at Centerville, Calif., during the first week in July.

The company owns a 300-acre tract rich in deposits of gravel beneath a light layer of overburden. Production is expected to run considerably higher than at Niles.

Eugene Sand & Gravel Co. Adds Three Trucks to Fleet

From its new Noble batching and central-mixing plant, the Eugene Sand & Gravel Co., Eugene, Ore., is making deliveries with three new 4-cu. yd. Dumpcrete trucks. Ordinary portland cement is used at the plant, the air-entraining qualities being provived by the addition of Darex at the mixer.

The Dumpcrete units augment the company's regular fleet of transit-mixing trucks.

personal mention

HERBERT A. SNOW, president of the Portland Cement Co. of Utah, has been named senior vice-president of the Utah Fuel Co., of which he has been a director since 1936. A past president of the Salt Lake City Chamber of Commerce, Mr. Snow is a director of several other corporate enterprises and heads the Utah Savings and Trust Co.

GERALD R. STARK has resigned as vice-president of the B. F. Nelson Manufacturing Co., Minneapolis, in order to become president and general manager of the Texas Vermiculite Co., which processes products used as light aggregate for plaster and concrete and for loose-fill insulation. The firm has a plant at Burnet, Tex., with headquarters at San Antonio.

DAVID A. WHITE JR. has been appointed director of public relations for the National Gypsum Company, Buffalo. He formerly was public relations officer for the Buffalo Regional Office of the Veterans Administration.

STEPHEN F. TUCKER has been appointed advertising manager of gypsum products for the National Gypsum Company, Buffalo.

MERRILL C. M. POLLARD of the National Gypsum Company, Buffalo, has been re-elected to the board of directors of the Western New York Safety Conference Inc.

The retirement of HENRY B. BAYLOR as vice-president of the International Minerals & Chemical Corporation was announced recently by the company. Association of Mr. Baylor with International terminated on July 1.

ED PILLAR is the new plant superintendent of the Consolidated Cement Corporation's plant at Fredonia, Kan. He succeeds FRED COOPER, who resigned from this post recently.

Mr. Pillar joined Consolidated at Fredonia in 1937, but subsequently was transferred to Cement City, Mich., and Chattanooga, Tenn. After serving in World War II he returned to Fredonia and his present position.

Mr. Cooper is now affiliated with the Rural Electrification Administration.

J. B. GANDER had been named president and chairman of the Mississippi River Sand & Material Company of St. Louis, Mo. Other officers include the following: JAMES J. FITZGERALD, vice-president; MICHAEL HENDY, treasurer; CARL R. MOEHLENHOFF, secretary; and OSCAR HEBENICHT and G. H. OETTING, directors.

LOUIS C. LERNER of Lerner & Company, Boston, has been named a director of the Coplay Cement Manufacturing Company.

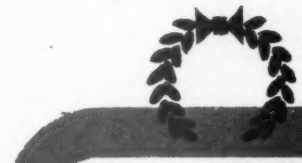
Among the state chairmen named for the Metal Mining convention and Exposition to be held the week of September 20 in San Francisco are the following:

W. S. LARSH, general manager, Nevada Mines Division, Kennecott Copper Corporation, McGill, Nev., for Nevada; G. T. HARLEY, manager, potash operations, International Minerals & Chemical Corp., Carlsbad, N. M. for New Mexico; FAY I. BRISTOL, president, Bristol Silica Company, Grants Pass, Ore., for Oregon.

HARRIS N. SNYDER, vice-president of the Buffalo Slag Co. Inc., has been appointed to a special committee on municipal development of the Buffalo Chamber of Commerce, which will work toward keeping public improvements abreast of industrial and commercial expansion.

G. F. COOPE, president of the Potash Company of America, Carlsbad, N. M., was recently named a member of the 1948-1949 Natural Resources Committee, Chamber of Commerce of the United States. This body is responsible for effectuating the Chamber's policies relating to this field.

WALTER J. SCANLON of the Federal Portland Cement Co., Buffalo, has been elected to the board of directors of the Buffalo Chapter of the National Office Management Association.



obituaries

JOHN A. BAUSCH, 71, a salesman for the White Rock Quarries Co. of Bellefonte, Pa., died recently in his home in Erie, Pa., after a heart attack.

FREDERIC P. BYINGTON, 71, retired vice-president of the Johns-Manville Sales Corp., of New York, died June 30 in Great Barrington, Mass., while on a vacation. His residence was in Manhasset, Long Island, N. Y.

Mr. Byington joined Johns-Manville in 1909, in the eastern division of the Architects Service Department, later became head of the company's architectural service for the entire country, and was named vice-president in 1934. He retired in 1945.

JOHN BARR AIKMAN, 82, who was from 1920 until 1945 general manager of the Vermont Talc Company at Chester, Vt., died on July 11. Mr. Aikman's death was due to a hip injury suffered in a fall at his home in Hillsboro, Va.

SIDNEY L. FULLER, 61, president of the Fuller Company, Milwaukee, Wis., died on May 2 at his home in that city. Before founding his own company in 1933 Mr. Fuller had been associated with the A. O. Smith Corporation for 15 years.

J. E. WILKINSON, who had been for about 28 years plant superintendent of the Memphis Missouri Portland Cement Company's plant, died at the age of 63 years on June 14. Before coming to Memphis Mr. Wilkinson had been employed by the cement company at East St. Louis, Ill.

EDWIN L. KEATING, who retired in 1944 as vice-president of the Colonial Sand and Stone Company of New York City, died on June 23 at his summer home in Danbury, Conn. Mr. Keating was 63 years of age. Before joining Colonial in 1904 he had worked with his uncle in the John L. Keating Sand and Gravel Company, the Manhattan Sand Company and the Norton Keating Company.

GEORGE R. WIDDESS, 60, discoverer of the mother lode of borax deposits in the Mojave Desert, died unexpectedly in his home in Santa Monica, Calif., on May 26. Death resulted from a heart attack. Mr. Widdess began prospecting in the Mojave Desert after World War I and discovered the mother lode at Kramer in 1923.

SYLVANUS J. FEHNEL, 62, assistant treasurer of the Nazareth Cement Company, died in an Allentown, Pa., hospital on June 26.

WILLIAM B. JONES, president of the Duquesne Slag Products Company, died on June 30 at Veterans Hospital, Aspinwall, Pa. He had been associated with the Standard Slag Company of Youngstown, O., before joining Duquesne in 1939.

HOW TO CUT SWITCHING COSTS

G-E 50-ton diesel-electric locomotive gives zinc smelting plant dependable, low-cost performance

Total operating and maintenance costs for the G-E industrial locomotive at a large zinc smelting plant in western Pennsylvania amount to only 47 cents an hour, excluding wages of engineer and brakeman. At present this money-saving 50-tonner operates seven days a week, twelve hours a day; but if the plant ever needs additional switching capacity, the locomotive can almost double these working hours. It is ready to work nearly 98 per cent of the time, or over 23 hours in every 24.

LITTLE MAINTENANCE REQUIRED

During the three years the 50-ton switcher has been in operation it has needed little or no mechanical maintenance. The engineer makes his daily inspections between switching assignments. Refueling is required only once every six days, whereas the gasoline locomotive which it replaced was out of service every day for this same operation. *Compare this performance with that of your own locomotive.*

FIVE STANDARD SIZES

You can reduce switching costs in your own plant with any of the five standard G-E locomotives which handle virtually all types of industrial switching jobs. They usually save thousands of dollars a year when replacing old locomotives, often pay for themselves in two or three years.

But you don't need to guess what your savings will be. Without obligation a transportation specialist will examine your plant's requirements, estimate your savings in advance. Call your nearest G-E representative today. Apparatus Department, General Electric Company, Schenectady 5, N. Y.

NO FIRE HAZARD

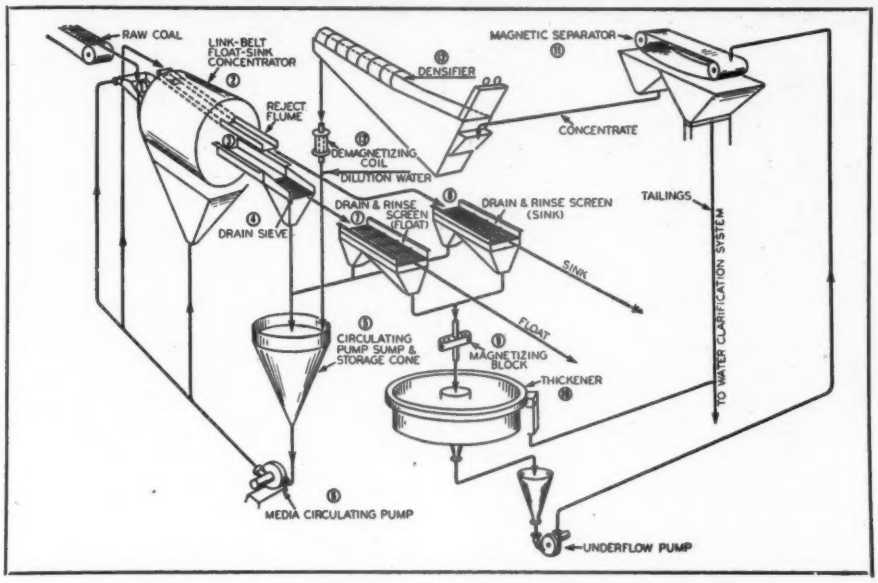
In plants where fire hazards exist, G-E locomotives provide safer switching for there are no dangerous sparks, no hot ashes.

Switch to GE Diesel-electrics *And Save!*

GENERAL ELECTRIC

new machinery and supplies

PIT AND QUARRY



Flow sheet showing operation of concentrator for nonmetallics.

● Concentrator for Minerals

A new float-sink concentrator for cleaning nonmetallic minerals has been developed by the Link-Belt Company. It consists essentially of a drum-shaped tank to contain the liquid medium and the rotating elevator with perforated lifter shelves which deliver the sink material to a flume. Only one operator is needed; and operating and maintenance costs are said to be low.

The feed enters through a flume and is immersed in a bath of medium inside the float-sink concentrator. The float material rises and passes over a discharge weir and a stationary sieve on which the medium is drained from the solids. Sink material is elevated from the bottom by means of a rotating wheel to a flume, from which it passes to the screen.

These products now pass under water sprays and over the drain, rinse and dewatering screens (of vibrating type). Nearly all the medium is recovered through the stationary sieve, passed to a sump and from there is re-circulated through a pump to the float-sink concentrator. Any particles of magnetite adhering to the solids after passing beyond the draining zones are rinsed off on the respective vibrating screens and delivered to a thickener, preceded by a magnetizing block which augments the settling of the magnetite by magnetic flocculation.

Heavy particles settling out of the thickener are pumped to a magnetic separator, which lifts the magnetite out of the slurry and delivers it to a densifier; this returns the cleaned-media solids to a medium circuit at uniform density and a uniform rate after being dispersed by passing through a de-magnetizing coil. These magnetite solids are blended in the proper proportion with water and returned to the medium circuit.

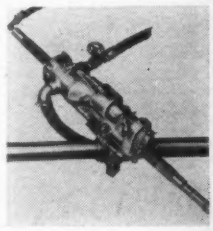
The tailings from the magnetic separator flow direct to the final water clarification system, into which also passes the overflow water from the primary thickener. The clarified water returns in closed circuit for re-use as sprays over the screens, separators, etc.

● Portable Washing Plants

Two new portable washing plants have been announced by Diamond Iron Works of Minneapolis. The No. 1024 combines crushing with screening and washing to produce two sizes of gravel, plus washed sand. The operation is straight line, with Rotorlift, employing the No. 1024 jaw crusher, 3 by 12 drag washer, 16 by 36 plate feeder, 8 by 8 loading hopper and grizzly.

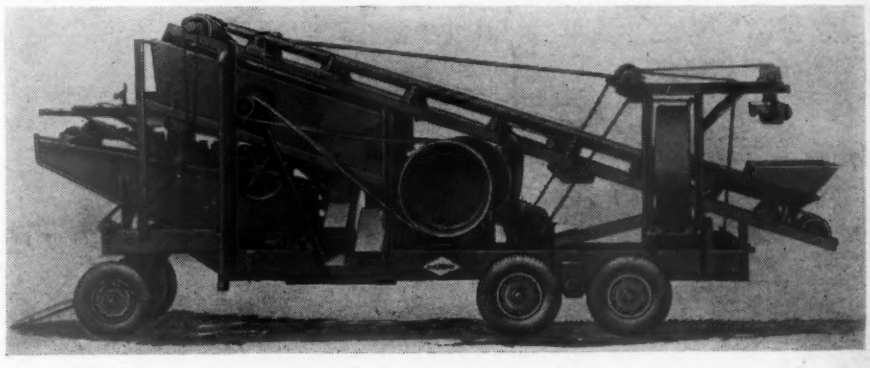
The second new portable is designed for washing and screening only and can be fed directly from the pit by dragline or shovel. This plant produces 5 sizes of washed material, employing a 3-deck spray-piped vibrator. It can be used with a suitable primary plant where needed. Dual pneumatic tires or steel wheels are optional on either plant. Shown on this page is the new No. 1024.

● Diamond Drill

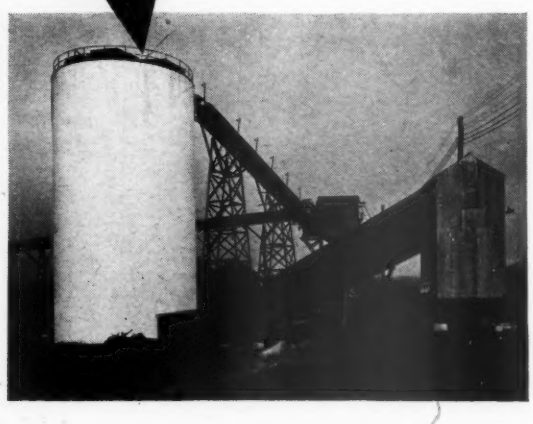


Chicago Pneumatic Tool Company of New York, N. Y., is introducing a new diamond drill, the CP No. 55. This model was designed as a companion machine to the CP No. 5, used for diamond core, blasthole, and grout hole drilling.

Chief feature of the No. 55 is the new rotary air motor developed for this machine by company engineers. Although exactly the same weight as the No. 5 motor, the No. 55 develops 25 percent more power. Thorough testing under all conditions definitely has proven that the No. 55 actually drills more footage at less cost than any previous model. This new machine has exceptional balance, which makes for easy handling.



SULPHUR is Stored Here!



ONE thing we had to guard against in this plant—as with storage and handling facilities for all combustibles—was the possibility of explosion. So, on the roof are several explosion doors . . . hinged doors which open outward should an explosion occur and are closed after the pressure is released. Twice, since the bin was built, explosions have occurred. Eact time the doors relieved the pressure and saved the bins from damage.

Knowing the answers to unusual storage and handling problems has assisted us in serving industry so well in connection with the storage of solids and liquids for nearly 35 years.

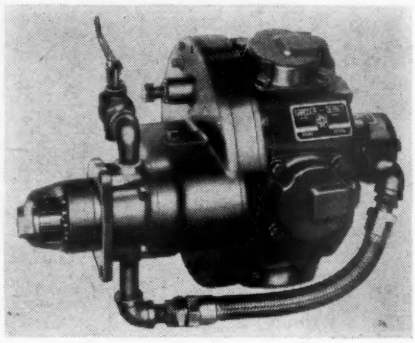
Construction costs are not coming down!
BUILD NOW

BULK STORAGE · COAL · GRAIN · LIQUIDS STORAGE · HANDLING EQUIPMENT
THE NICHOLSON CO.
CONSTRUCTION · CEMENT · OIL · CHEMICALS

TEN ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

● Air Starter

A new line of air starters for gas, gasoline or diesel engines, including five sizes, developing from 3 to 15 horsepower on 100 pounds' air pressure, has been announced by Gardner-Denver Company of Quincy, Ill. The principal advantages of these air starters, company officials explain, are their extremely



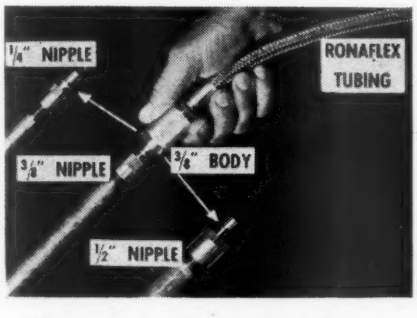
high torque and the elimination of costly battery maintenance and replacements. The high torque characteristic of the piston-type motor, it is said, makes it especially desirable for diesel applications involving high starting loads, while the 5-cylinder radial design provides even torque through the operating cycle.

A notable feature is an air actuated starter pinion which, when the air valve is open, automatically engages the ring gear a split second before the starter begins to crank the engine, thus assuring positive and safe engagement.

● Coupling Assemblies

Increased convenience for the user and substantial reduction in flexible tubing parts inventory are reportedly possible through a design development offered by Ronaflex Tubing Co., Inc., Packard Building, Philadelphia 2, Pa.

Ronaflex assemblies, the flexible-as-



rubber, tough-as-steel tubing with snap-on couplings, are interchangeable on various nipples. As illustrated, the ⅜-in. Ronaflex coupling body fits ¼-, ⅜- and ½-in. nipples. The ¼- and ½-in. bodies also fit all three nipples.

The degree of interchangeability varies with the type of coupling and with the size. The 1½- and 2-in. regular coupling bodies, for example, are interchangeable with 1½-in. and 2-in. nipples. Thus, a limited number of sizes of Ronaflex assemblies will fit a wide variety of nipple sizes. Only a relatively few sizes of assemblies need be stocked to fit all sizes of nipples from ¼- to 2-in.

● Portable Quarry Plant

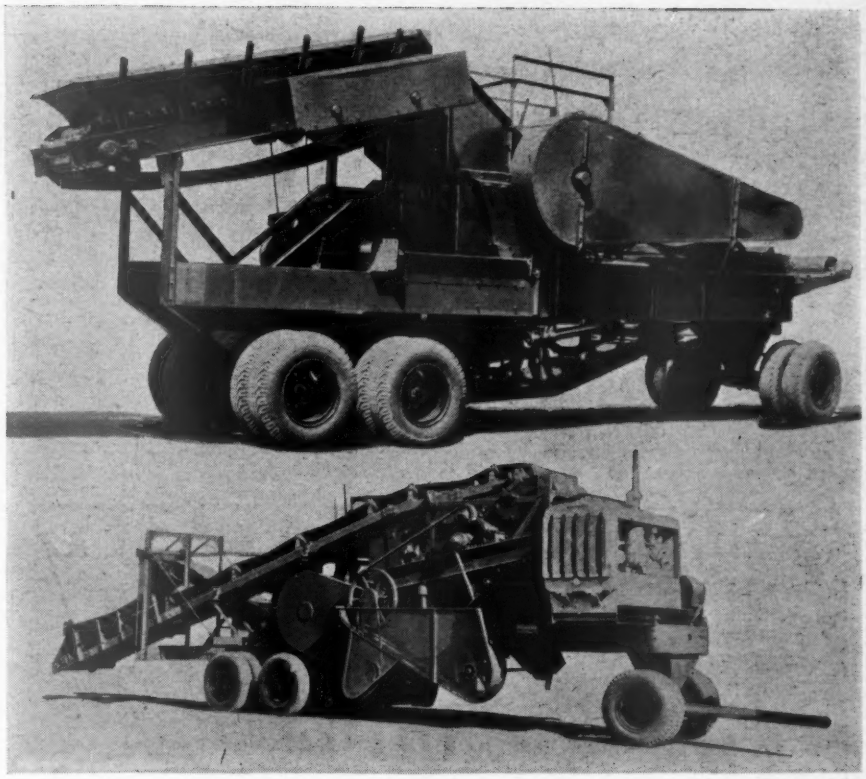
Pioneer's new line of 2-unit portable plants for quarry operation has been designed in view of greater production from a mobile plant set-up. The utilization of two separate chassis on pneumatic tires permits the building of larger crushers and screens into each unit without making the unit weight excessive. (See illustration at right.)

The plant arrangement is such that primary feeding and crushing is done on the first unit, leaving the second for secondary crushing and screening. It is thus possible to combine balanced units to keep the maximum flow of material through each plant.

Another important feature is the split feed arrangement to the screens of the secondary plant. This provides two complete screening surfaces for specification material, thus doubling the screening area of the plant.

The jaw crusher in the primary unit may be a 1536, 2036 or 2436. The roll crusher in the secondary may be a 4022 or 5424, with the screen a 4 by 10 ft. or 4 by 12 ft. on each product deck.

A gravel primary is also available with either a 1036 or 1536 jaw crusher and a 4 by 6 ft 1½ deck screen. For gravel installations added sand rejection is provided by the screen in the primary. Pioneer Engineering Works, Minneapolis.



● Tandem Axle Dump Trailer

McCabe Powers Auto Body Company has announced its introduction of a new tandem axle dump trailer. Designated as "Model P-20", its standard specifications provide a flexibility of construction to adapt this dump trailer to varied individual job requirements.

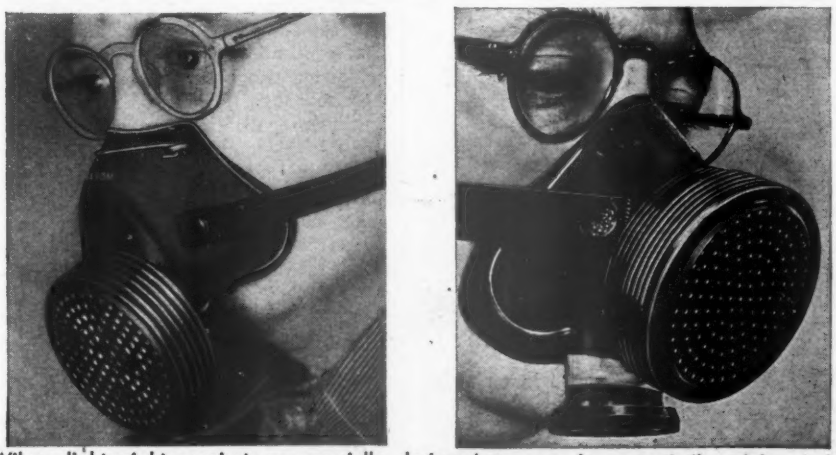
The use of U.S.S. Cor-ten, hi-tensile steel reduces the overall weight of the dump trailer. This is said to make possible a greater payload capacity—50 percent—and ease of driver handling. A reduction in the number of trips to do a job results in economy, according to the manufacturer.

General specifications of the tandem axle dump trailer are as follows: Inside body length, 20 ft.; sides and front, 60 in. high; cross-members are structural steel channels—made into box sections at pivot and hinge points for additional strength; twin cylinder hoist with a 52½-in. stroke; maximum oil pressure under full load, 825 p.s.i. of piston area; dumping angle of 45 deg.; rubber-mounted interchangeable fifth wheel (33-in.).

● Front-End Loader

A new type of labor-saving tool for contractors and industries, the Arrow "Scooter-Loader" reportedly does the work of four or five men with wheelbarrows in charging concrete mixers, moving and loading loose materials such as earth, sand, gravel, cement, clean-up work, etc. Bucket capacity is 8 cu. ft. or an equivalent load of 1,200 lbs. with clearance of 4½ ft. for loading new-type power dump carts, as well as mixer skips.

The drive is to the front wheels, on which the weight of the machine and its load are centered for maximum traction and ease of control. A caster-type rear wheel enables the Scooter-Loader to turn in its own length—a great advantage. Its transmission provides four forward speeds for a complete range of power and travel up to 15 m.p.h., plus one reverse speed which is needed only for backing before turns. Traction-grip pneumatic tires provide ample traction on soft or sandy ground. The machine is powered with an 9-hp. air-cooled engine. The loader is compact enough to work inside freight cars, as well as factories and yards. The price of the Scooter-Loader is approximately one half that of larger capacity front-end loaders. Arrow Contractors Equipment Company, 2020 Walnut St., Chicago 12, Ill.



Wilson lightweight respirators, especially designed for use in nonmetallic mining industries, have been approved by the U. S. Bureau of Mines. Models 5D (left) and 45D (right) are particularly suitable for protection against dusts such as are common to quarry and mill work. Willson Products, Inc., Reading, Pa., also manufactures gas masks, monogoggles, safety goggles, welding helmets and similar equipment.

trade notes

A newly established firm located in Cincinnati, O., is the Ortner Company, which has purchased all assets of The Railway Accessories Company and will continue in the purchase, repair, conversion and sales of all types of railroad equipment. It will also act as a sales agency for a number of railway supply manufacturers.

Officers of the concern include the following: J. L. Ortner, president; J. L. Ortner Jr., vice-president; R. C. Ortner, secretary and treasurer; L. J. Ortner, Eastern representative, with headquarters in Buffalo, N. Y.

R. R. Schultz

The promotion of R. R. Schultz to sales manager of the Crusher and Process Machinery Divisions of Nordberg Manufacturing Company has been announced by D. A. Cheyette, vice-president.

Mr. Schultz joined Nordberg in 1938 as a sales engineer and served a year in the Canadian Branch office at Toronto. He was promoted to assistant sales manager in 1946. From 1942 to 1945 Mr. Schultz served as Captain, Corps of Engineers, Army of the United States. Prior to coming to Nordberg he was associated with the Traylor Engineering and Manufacturing Co. of Allentown, Pa.

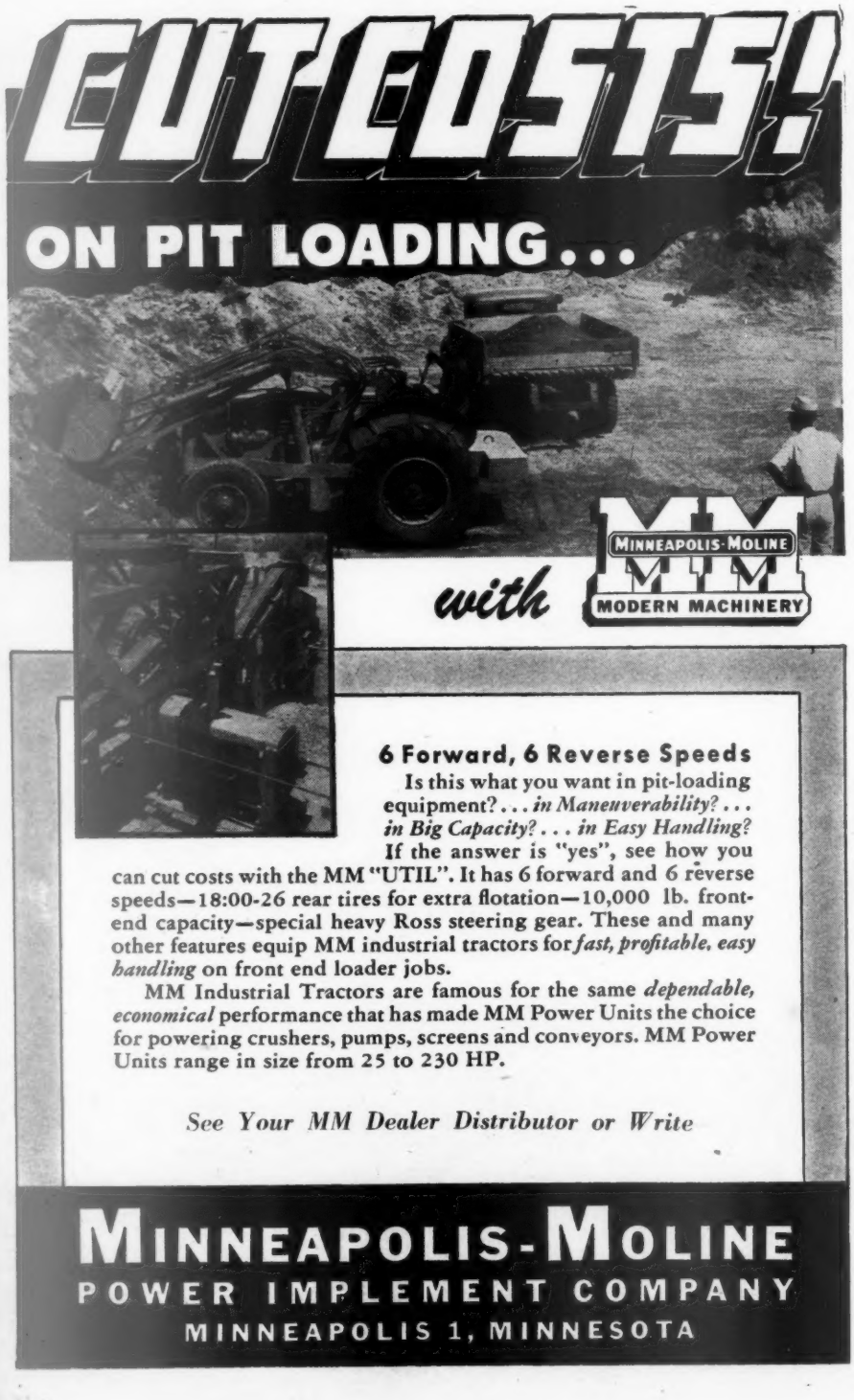
Organization of a sixth region for the Allis-Chalmers general machinery division's field organization under William Arthur, formerly Philadelphia district office manager, has been announced by J. L. Singleton, vice-president and director of sales.

The new area, designated as the Mid-Atlantic region with headquarters in Philadelphia, will embrace territory now covered by Philadelphia, Wilkes-Barre, Baltimore, York, Richmond and Charleston offices. The York and Charleston offices, managed by G. E. Conn and R. L. Halsted, respectively, formerly branch offices, now become district offices.

Mr. Arthur is succeeded as Philadelphia district office manager by Frank Freyler, former manager of the Cincinnati district office. Mr. Freyler, in turn, is succeeded by W. F. Daly.

The General Electric Co. held a press review of its new More Power to America Program, "Materials Handling in Receiving, Warehousing and Shipping" in July, at the La Salle Hotel, Chicago, following similar previews in other cities. This program is the result of 18 months' research by G. E. materials-handling authorities, working in close cooperation with the manufacturers of materials-handling equipment. It pointed out that adequate mechanization is being neglected, in spite of the fact that equipment for most requirements is now available. Speakers included F. W. McChasney, J. R. Kilander, and S. W. Corbin.

A part of the program was a 20-minute all-color sound movie which illustrated in actual use the many different types of modern handling equipment, including lift-trucks, conveyors, cranes, etc. Also shown was a complete and valuable manual on materials handling which is available at a cost of $1.00 per copy upon application to the company at Schenectady, N. Y.


CUT COSTS!
ON PIT LOADING...
with
MINNEAPOLIS-MOLINE
MM
MODERN MACHINERY
6 Forward, 6 Reverse Speeds
Is this what you want in pit-loading equipment?... in Maneuverability?... in Big Capacity?... in Easy Handling?
If the answer is "yes", see how you can cut costs with the MM "UTIL". It has 6 forward and 6 reverse speeds—18:00-26 rear tires for extra flotation—10,000 lb. front-end capacity—special heavy Ross steering gear. These and many other features equip MM industrial tractors for fast, profitable, easy handling on front end loader jobs.
MM Industrial Tractors are famous for the same dependable, economical performance that has made MM Power Units the choice for powering crushers, pumps, screens and conveyors. MM Power Units range in size from 25 to 230 HP.
See Your MM Dealer Distributor or Write
MINNEAPOLIS-MOLINE
POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA

Due to the unprecedented demand for trained instrument engineers caused by postwar public utility and industrial plant expansion, Bailey Meter Company, Cleveland, O., is expanding its staff of field engineers. The company announces that the following assignments have been made: H. E. Bitler to its Buffalo office; M. J. Bonnette and R. W. Hooper to the Houston area; J. W. Cunningham to its Atlanta office; H. G. Hilston to its Cleveland district office; J. O. Meals to its St. Louis office; L. W. Meier to its Los Angeles office. J. R. Brennan, J. A. Hays and R. P. Marche are remaining at the Cleveland main office, where they will be attached to the engineering, research and sales departments, respectively.

R. W. Head

Marion Power Shovel Company of Marion, O., has announced the appointment of R. W. (Bob) Head as its district sales manager, with headquarters in Dallas, Tex. His territory will include Texas, New Mexico, Oklahoma and part of Arkansas. He succeeds I. D. (Doc) Lumby, who represented Marion in the Texas district for 10 years.

D. J. Carroll Copps has been appointed Chicago district sales manager for the Explosives Department of Atlas Powder Company. Mr. Copps succeeds J. H. Buchanan, who has resigned to enter private business. The Chicago district includes Illinois, Minnesota, Wisconsin and parts of Indiana and Michigan.

Election of A. N. Morton and A. C. Fetzer as vice-presidents of Mack Trucks, Inc., has been announced by President C. T. Ruhf. Both Mr. Morton, who is in charge of the company's manufacturing operations, and Mr. Fetzer, general sales manager, will continue to make their headquarters in the company's home offices, Empire State Building, New York City.

Ferguson Supply Alberta Ltd. of Calgary, Alt., Canada, has been appointed exclusive distributor for the Euclid Road Machinery Co., covering the entire Province of Alberta. The appointment of this new distributor will provide improved service and parts facilities to contractors and owners of Euclid equipment in Alberta.

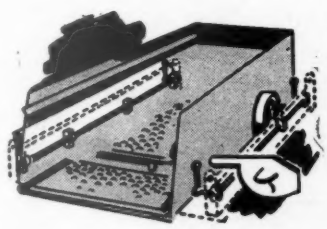
Fred H. Haggerson, president of Union Carbide and Carbon Corporation, has announced the election of William J. Priestley as a director of the corporation. Mr. Priestley has been with the organization since May 1, 1923, and has been a vice-president in charge of the Alloys and Metals Division since November 27, 1945.

QUESTION:

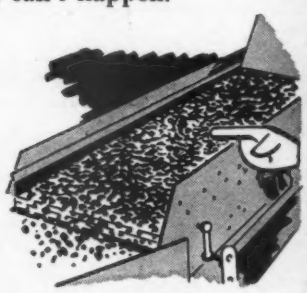
What ONE thing makes a SECO different than *any* other vibrating screen?

ANSWER:

SECO'S EXCLUSIVE FULLY CONTROLLED TRUE CIRCULAR ACTION



RIGHT HERE, SIR! is where the difference begins. SECO'S patented equalizer assembly (shown in cutaway) connects with the live body at four points to positively control the circular motion of the screen in operation. Bobbing, weaving and heaving just can't happen.



NOW YOU CAN SEE WHY the load moves evenly, smoothly with more efficient screening results — and less wear and tear on moving parts. The results obtained by thousands of users is the best proof of this.

Write Dept. L for A Guide to Better Screening.

SECO

SCREEN EQUIPMENT COMPANY, INC.
PRODUCERS OF VIBRATING SCREENS EXCLUSIVELY
Buffalo 21, New York
In Canada: United Steel Corp., Ltd., Toronto

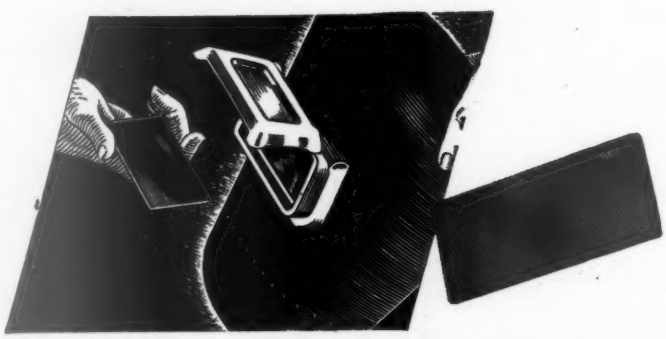
under "Arc lights" ... think of WILLSON

Style No. 130

A LITTLE MONEY GOES A LONG WAY . . . to give dependable protection to face and eyes in this ruggedly built, low cost helmet. Willson-Weld glass in non-corrosive metal holder.

Style No. 60S

GIVE WELDERS' EYES A LIFT . . . Flip-front on this one piece helmet allows quick, easy inspection and is convenient for working in close quarters. Willson-Weld Glass in hinged portion.



THE MARK OF MEASURED PROTECTION . . . The Willson-Weld* trade-mark on welding glass is your assurance of accurate grading for density of shade and thickness to meet or exceed government specifications.

For complete information on these products and their application, as well as many more eye and respiratory protective devices, get in touch with your nearest Willson distributor or write us direct.

*Reg. U. S. Pat. Off.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON PRODUCTS INCORPORATED

READING, PA., U. S. A. Established 1870

102 THORN ST., READING, PA., U. S. A.

The New York Belting & Packing Company of Passaic, N.J., has announced the appointment of Bonner & Barnewall, Inc., 92 Bleecker Street, New York, as its distributor for the New York area. J. Allan Machin, newly-appointed vice-president of Bonner & Barnewall, will supervise distribution of belting, hose, packing and other industrial products made by New York Belting.

Appointment of Merle J. Graham as manager of the West Leechburg, Pa., plant of Allegheny Ludlum Steel Corporation has been announced by M. C. Harris, vice-president in charge of production. Appointment of Frank G. Benford as assistant plant manager also was announced.

The appointment of Walter A. Kamp as sales manager, paper specialty plant of the Bemis Bro. Bag Co. at St. Louis, has been announced by Manager H. C. Davis. Mr. Kamp started with the Bemis organization in 1923 in the St. Louis Waterproof Department.

Appointment of Robert C. Dunbar, as West Coast representative, has been announced by Stanley M. Hunter, vice-president of American Hoist & Derrick Company. Mr. Dunbar will represent the Small Products Division.

R. C. Dunbar

Harold A. Jope of Wethersfield, Conn., has been appointed sales representative for the western half of Connecticut by the Hendrick Manufacturing Company of Carbondale, Pa., manufacturers of perforated metals, screens and open steel flooring.

Retirement of Joseph Furlong, consulting mining and metallurgical engineer with the Allis-Chalmers basic industries machinery department after 60 years of service, has been announced by G. V. Woody, department manager.

The Wonders of Wire Rope, a publication with the eye-catching makeup of a comic book, is a recent presentation of the Broderick & Bascom Rope Company of St. Louis, Mo., manufacturers of "Flex-Set" preformed Yellow Strand wire rope.

In familiar tabloid style and colors the story of the Hale family is unfolded as the almost incredible services of wire rope are observed. Beginning in the quarry, where Jimmy Hale's father, operator of a big power shovel saves the boy from death beneath a falling boulder, throughout a long vacation trip, the Hales see countless applications of wire rope. For an extra thrill, the sturdy cable even helps to catch a car thief.

Appointment of the Monarch Electrical Company of LaSalle, Ill., as a distributor of the entire Hewitt Rubber Division's line of industrial hose, conveyor and transmission belting, and packing, was announced here by J. H. Hayden, vice-president in charge of sales, Hewitt-Robbins Inc. Monarch Electrical Company serves all local industry within a radius of 75 miles of LaSalle.

Edward Louis Bushman, 91, founder and retired president of the Modern Valve-Bag Co., which manufactured bags for packaging cement, died on May 24 in East Orange, N. J., where he resided for 18 years. Mr. Bushman retired in 1941 after his company was merged with the St. Regis Paper Co., Allentown, Pa.

A. C. Fetzer, Mack Truck vice-president and general sales manager, announces the following appointments: C. E. Cole has been made district manager in charge of the Los Angeles branch; Lawrence D. McLean, district manager in charge of the Reading (Pa.), branch; T. H. Jones, district manager in charge of the Charlotte (N.C.), branch; and William Dudde, district manager in charge of the Bronx (N.Y.), branch.

Howard C. Bryan has been appointed manager of the Minneapolis office of the Multiwall Bag Division of the St. Regis Sales Corporation, subsidiary of St. Regis Paper Company.

Mr. Bryan, formerly assistant manager of the Denver office, succeeds H. A. Hughes Jr., who has been transferred to the head office in New York.

Rock-Dust Tests Reported By U. S. Bureau of Mines

To localize a coal-dust explosion in a mine, rock dust must be applied to within 40 feet of the working faces, instead of 80 feet as now required by the Federal Mine Safety Code, according to the U. S. Bureau of Mines. Furthermore, the rock dust must be spread liberally enough to produce a dust mixture that is 65 or more percent incombustible.

The Bureau of Mines made a series of tests recently at its experimental mine at Bruceton, Pa., to determine the adequacy of the safety code's rock-dusting provisions, Director James Boyd stated.

The most common material used in modern coal mines to localize gas and coal-dust explosions is pulverized limestone. Applied by hand or by blower machines to the roof and walls of mines, the inert dust mixes with the coal dust and renders it incapable of originating or propagating or extending an explosion. Fine bituminous coal dust is highly explosive when suspended in the air in a dense cloud.

The tests showed the Code's provision calling for enough rock-dusting to produce a mixture that is at least 65 percent incombustible is generally adequate, although under some conditions it cannot be depended upon to keep an explosion from spreading beyond the room in which it starts.

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Take a good look at this sprocket. Though badly worn, it is being built up with P&H Hartop. When the hard-surfacing is finished, this sprocket will cost ½ as much as a new one and will last 2 to 3 times longer. For Hartop's hard, protective coating gives you that much extra service. That's why using Hartop is a quick, low-cost way for you to keep your equipment at work longer, make it more productive. Hartop comes to you in handy weather-proof containers. You owe it to yourself to have a supply of these easy-to-use electrodes on hand. Four different types are available to give you the hardness you need:

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Hartop Green has a Rockwell C hardness of 45-50.

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And Hartop Yellow is the hardest electrode in the group — its Rockwell C reading is 58-63.

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"KEEPS PROMISES"

legal decisions

By LEO T. PARKER
Attorney at Law, Cincinnati, Ohio

Recently a reader wrote: "I have a law suit to fight. The state sued me to collect taxes they should not have. Please help me win the suit. I started my brother in the sand and gravel business and advanced him necessary capital. Also, I assisted him to make a success of the business. Now the state claims I am liable for payment of taxes against the business. Is this so?"

The answer to your question depends on the answer to this question: Did you control your brother and the business? If so, you are liable for payment of the taxes. On the other hand, if your brother had control of the employees, and also operated the business according to his own ideas and dictations, the brother is liable for payment of these taxes. This is so because one who "controls" a business is the employer, and therefore liable for payment of taxes.

For illustration, in *State v. Dean,* 188 Pac. (2d) 355, the testimony showed facts, as follows: One Dean permitted the use of his credit rating to assist his two sons-in-law in organizing and opening of the business. An auditor for the state made an audit of the books of the business and prepared reports which Dean signed *because* of the absence of the sons-in-law.

Soon afterward the state sued Dean to recover payments of various taxes among which were taxes under the State's Unemployment Act, contending that Dean was the real owner of the business and that his sons-in-law were mere employees.

The evidence tending to place Dean in the position of owner consisted of the reports prepared by the auditor of the state and signed by Dean at the auditor's request without reading them.

The evidence introduced in Dean's favor was that he had no financial interest whatsoever in the business other than that he used his credit and past experience in financing his two sons-in-law.

The higher court refused to hold Dean liable as owner of the business because no testimony was given which proved that Dean "controlled" the business.

Testimony Is Conflicting

Very frequently a jury will render a damage allowance excessively high whereby a higher court may either order a new trial or reduce the damage allowance.

For example, in *Hurt v. Basalt Rock Company,* 190 Pac. (2d) 240, the testimony showed facts, as follows: One Hurt was employed by a firm of mining and metallurgical and chemical engineering consultants who had been then hired by the rock company to conduct research in connection with the development of a lightweight aggregate as a constituent of building blocks.

Hurt sued the Basalt Rock Company for damages and alleged that one day while he was working in the laboratory the president of the Basalt Rock Company, accompanied by a laborer, one Bennett, entered the laboratory and accused Hurt of attempting to bribe one of the employees to give him a sample of raw material on which other experiments were being secretly conducted.

The jury awarded Hurt $12,500. However, the higher court reduced the

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award $300 as final settlement, saying:

"An examination of the record before us discloses that the evidence on the question of the truth or falsity of the defamatory remarks is in decided conflict."

Not An Employee

According to a recent higher court one employed to haul material in his own truck at an agreed price per load is an independent contractor who cannot recover compensation under the State Workmen's Compensation Act for death or injury.

For example, in *Perley v. Ballenger Paving Company,* 46 S. E. (2d) 298, it was shown that a driver named Perley was driving a truck loaded with sand and gravel when struck at a railroad crossing by a train and instantly killed. The defendant, Ballenger Paving Company, was engaged in laying base for highway paving and was using a concrete mixer which was moved as the work progressed. Perley was hired by the Ballenger Paving Company and was hauling sand and gravel from the bins of the Grovestone Sand Company when killed. His dependents sued to recover compensation under the State Workmen's Compensation Act.

The testimony showed that Perley owned his own truck, and he was paid $2 for each load of sand and gravel he hauled. The higher court refused to award compensation, saying:

"After a careful analysis of this testimony, we reach the conclusion that the relationship of the decedent (Perley) to the defendant (Ballenger Paving Company) at the time of the injury, was that of an independent contractor, and not an employee."

Lien For Repairs

According to a recent higher court a garage owner can deliver a motor truck to its owner without collecting the repair charges, and the garage owner has a lien on the truck purchased by one who had no knowledge of the lien.

For example, in *Watson v. Broadhead,* 33 So. (2d) 302, it was shown that repairs on a truck used to haul sand and gravel were made by a garage owner. Each time repairs were made the truck was driven away by the owner without payment of the repair charges. Later the owner of the truck sold it to one White.

In subsequent litigation the higher court held that the garage owner had a lien on the truck to secure payment of the repair charges.

Hence, if White had refused to pay the repair bill the garage owner could have taken possession of the truck and sold it to receive the amount of his bill.

Ordinance Is Valid

A city ordinance is valid which designates a certain route for motor vehicles going through the city.

In *Blumenthal v. City of Cheyenne,* 186 Pac. (2d) 556, a city ordinance was passed which prescribes a definite route motor carriers must take when passing through the city.

The higher court refused to hold the ordinance void.

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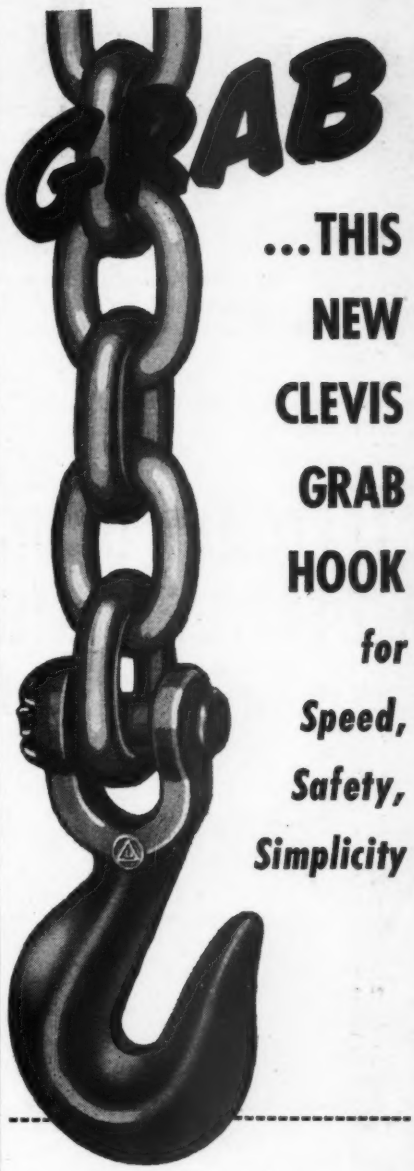

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traffic news

CENTRAL FREIGHT ASSOCIATION DOCKET

Docket 85476 (2)—Proposed to establish on crushed stone, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Russellville, Ind., to Beardstown, Ill., 121 cents; Springfield, Ill., 108 cents net ton.

Docket 85602—Establish on lime, common, hydrated, quick or slaked, carload, from Luckey, O., to E. Aurora, N.Y., 18 cents (minimum weight 30,000 pounds); 14 cents (minimum weight 50,000 pounds).

Docket 85621 — Establish on stone, crushed, in bulk, in open-top cars, carload minimum weight 90 percent of the marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Russellville, Ind., to Speedway, Ind., 77 cents net ton.

Docket 85523—Establish on agricultural limestone, unburned, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full visible or cubical capacity, actual weight will apply from Bloomington, Ind., to Sullivan, Ind., 66 cents net ton.

Docket 85591 — Establish on stone, crushed, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when loaded to full cubical or visible capacity, actual weight will apply.

From Georgia, Ind.	Per net ton
Mode, St. Elmo, St. James, Holland, St. Peter, Loogootee, and Kimmundy, Ill.	138
Brubaker, Cartter, Kell, and Texico, Ill.	132
Bonnie, Mt. Vernon, Ina, Whitington, Benton, Orient, West Frankfort, Johnston City, and Marion, Ill.	139

Docket 85634 (2)—Re-establish on stone fluxing, furnace or foundry, melting or refractory (unburned) in bulk, in open-top equipment, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply.

Rates in Cents per Gross Ton, Including ExParte 123

From Durbin, O., to	
Akron, Alliance, Canton, Cincinnati, and Dover, O.	1.24
Follansbee, W. Va.	1.27
Hamilton, O.	.88
Beaver Falls, Pa., and Cleveland, O.	143
Belle Vernon, Bessemer, and Butler, Pa.	162
Findlay, O.	194
Anderson, Ind., and Chicago, Ill.	197
Huntington, W. Va.	183
Buffalo and Dunkirk, N. Y.	221
Athens, O., and Detroit, Mich.	222
Bay City and Grand Rapids, Mich.; Bloomington, Ill.	292
Flint, Mich.	277
Erie, Pa., and Fort Wayne, Ind.	208
E. St. Louis, Ill.	305
Grafton, W. Va.	361
Big Rapids, Mich.	402

Rates are subject to ExParte 162 and 166 increases.

Docket 85638 (2)—Establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds.

From Hannibal, Mo., Quincy, and Marblehead, Ill., to	Net Ton
Albany and Troy, N. Y.	5.78
Bridgeport, Conn.	6.60
Boston and Malden, Mass.	7.04
Danvers and Everett, Mass.	7.04
Brooklyn, Glendale, and Long Island City, N. Y.	6.88
Carney Point, N. J., New Castle, Del., Phillipsburg, Pa.	5.67
Jersey City and Passaic, N. J.	6.11
Valhalla, N. Y.	6.22

Docket 85650 (2)—Establish on limestone, ground or pulverized, (unburned), crushed stone screenings, not ground or pulverized, (unburned), and stone dust (unburned), carload minimum weight 60,000 pounds from Plum Run and Shimer, O., to Ripley, W. Va., 193 cents net ton.

Docket 35663 (2)—Establish on lime.

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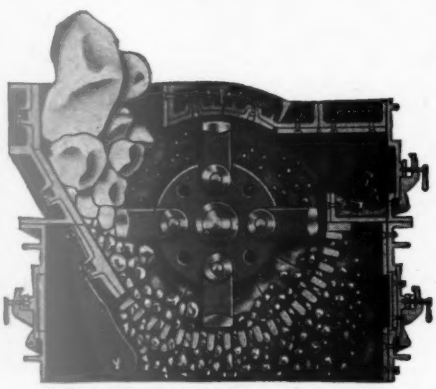

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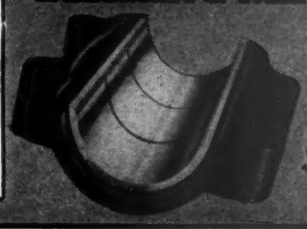

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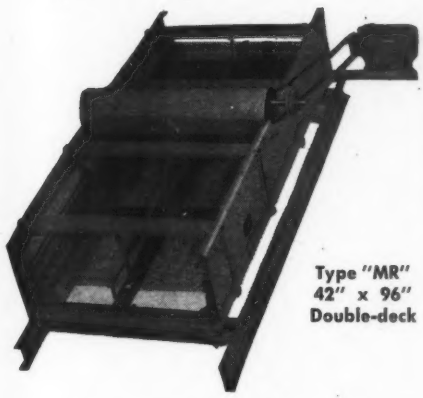

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	Min. Weight 30,000 pounds	Min. Weight 50,000 pounds
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Peebles, O.	15	12
Cissna Park, Ill.	17	13
Paw Paw, Mich.	19	15
Otisville and Fremont, Mich.	20	17
New Richmond, O.	19½	17½
Remus and Lakeview, Mich.	21	17
Hart, Mich.	20	17

Rates subject to ExParte 162 and 166 increases.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

Docket 71277 (1-R)—It is proposed to establish a commodity rate on stone, crushed minimum weight 50 tons of 2000 pounds, except that when cars of lower capacity are furnished for carrier's convenience, the carload minimum weight will be the marked capacity of the car, from Greenfield, Mass., to Fitchburg, Mass. Present, $1.47 per net ton mileage commodity rate per B&M Railroad Tariff ICC A 3107. Proposed 75 cents per net ton. Rates include ExParte 162-A increase but are subject to ExParte 166-A increase. Reason: To enable the B&M Railroad to obtain a haul on this material.

ILLINOIS FREIGHT ASSOCIATION DOCKET

Docket IRC511-722—Crushed stone, carload minimum weight 90 percent of marked capacity of car except that when car is loaded to full visible capacity, actual weight will apply, from Rock Island, Ill.

	Cents per Ton	
To Illinois Points	Present Rates	Proposed Rates
Buda	220	99
Galva	180	88
Barstow	140	66
Lynn	180	77
Henderson	200	88
New Boston	180	99
Youngstown	220	110
Vermont	240	121
Carthage	260	121

Rates are subject to X-162-A and X-166-A increases.

WESTERN TRUNK LINE NEW APPLICATIONS

Docket D 25-206—Proposed to establish rate of 14 cents per hundred weight, minimum weight 50,000 pounds, on lime-sludge, carload, from Chicago, Ill., to Amherst Junction, Wis.

TRUNK LINE ASSOCIATION DOCKET

Docket 44853 (carriers)—Roasted dolomite (refractory dolomite in granular form, treated or untreated, clinkered or burned to a dead state) minimum weight 90 percent of marked capacity of car, etc., from Millville, W.Va., to Milton, Pa., $2.06 per net ton. Subject to Tariff of increased Rates and Charges X-162-A and Tariff of Emergency Charges X-166-A, amendments thereto and reissues thereof, in lieu of present 6th class rate.

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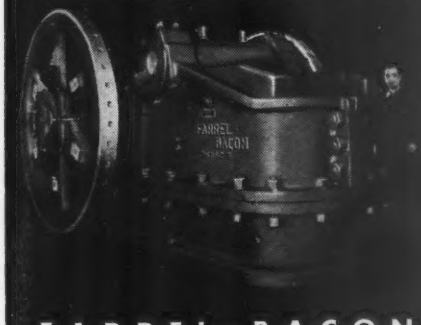

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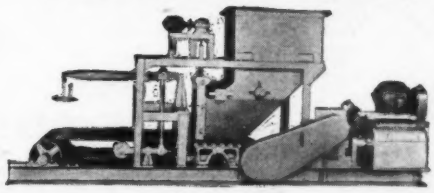

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The CONCRETE MANUFACTURER

AUGUST 1948

Vol. 13 No. 2

A MAGAZINE DEVOTED TO PRODUCTION OF CONCRETE MASONRY AND OTHER PRODUCTS AND READY-MIXED CONCRETE

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HARRY F. UTLEY

W. Tex. Concrete Products Operating Plants in Three Lone Star Boom Sections

A new ready-mix operation that is going places is West Texas Concrete Products, Inc., of Odessa, Tex., of which Weaver Cunningham, formerly of Lone Star Cement Corp., is vice-president and general manager.

The West Texas company was organized early in 1947, when the owners took over the F. M. Reeves & Sons plant in Odessa and put in a branch in Monohans, operated by W. G. Kirkland, superintendent. Later the Kermit Concrete Co., an affiliate, was started in Kermit, a nearby town, with Harold House as manager.

Concrete tile is produced at the Odessa plant in addition to ready-mixed concrete, and all three plants face a rapid growth, being located in the rich west Texas oil field where the demand is great. Increased production right now is limited by the scarcity of cement, but once that bottleneck is broken all three operations will be working at capacity for some time.

Austin Concrete Plants Make Attractive New Products

Remember the way your grandmother used to bake corn bread? That's the way concrete stepping stones are being turned out in the plant of Precast Concrete Products Co. at Austin, Tex., of which F. L. Altman, an Air Corps veteran, is president.

Precast Concrete has built up a nice business in stepping stones, largely by accident. Each night, as a result of production of block and tile on the Fleming and Appley machines used in the plant, there was surplus concrete, and Mr. Altman conceived the idea of using the surplus to make a specialty. Stepping stones was a logical answer, so he had 45 forms made up of 10-gauge steel and started in.

The forms look exactly like the pans Grandmother used for turning out corn bread, and the product itself is not unlike a good loaf of the favorite Southern staple, except that it would probably tear out a few fillings after setting overnight or wreck that new set of phonies the dentist charged you $150 for. But for the purpose, the product is all one could ask for, and color is combined in such a way as to afford an attractive pattern for either sidewalk, patio or garden walks; and at considerably less cost than straight concrete construction.

Two sizes are made—12- by 12-in. and 12- by 25-in.; each size is 2½ inches thick to insure against breakage. Standard portland cement is used in the summer and high-early strength in the winter, with a little calcium chloride added.

Down the street—almost a next-door neighbor—is the concrete products plant of the Roach Bros., where a similar specialty is made—a 5- by 6- by 12-in. block with two 3½ in. cores that makes up into an extremely attractive patio wall, or is adaptable for any purpose where a fence might be used. A coping is cast in a special form that finishes the top. The cores, which do not show when the blocks are set up staggered, are useful for wiring when light standards may be desired.

Roach Bros. have one of the newer plants in Austin, having started in 1946. It was impossible to buy, beg, borrow or steal a block machine at the time. The Roaches did as a number of concerns in this business have done—they had a machine made in a local shop, which has proved satisfactory. It has a capacity of 400 an hour of 5- by 8- by 12-in. or equivalents.

Kenmore Building Materials Co. Begins Producing Ready-Mix

An outgrowth of the Bothell Sand and Gravel Company at Bothell, Wash., the Kenmore Building Materials Company, Inc., was opened recently, offering ready-mixed concrete for construction projects. Members of the firm are George Millman, Dwight F. Thompson (former owner of the Bothell Sand and Gravel Co.) and the Pioneer Towing Company, Inc., of Seattle.

The ready-mix plant is located on Lake Washington at Kenmore, Wash., where the company made a 5,500-yd. fill and constructed a 200-ft. bulkhead. A 15-ft. channel was dredged 1,800 feet into the lake to permit entry of tugs and barges; at the site of the plant it was widened to 60 ft. In addition to ready-mixed concrete, the firm also handles drain tile, sewer tile, masonry building units, brick, sand, gravel and cement.

Coming Events

September 22, 1948 — Colorado Springs. Directors' meeting, National Ready Mixed Concrete Association, The Broadmoor.

January 31-February 3, 1949—Cleveland. Annual convention and exposition, National Concrete Masonry Association, Cleveland Auditorium.

February 14, 1949—New York. 19th annual convention, National Ready Mixed Concrete Association, Hotel New Yorker.

N.C.M.A. Officials Satisfied With Progressive Policies Of Florida Block Producers

A group of officers of the National Concrete Masonry Association recently completed an inspection tour of Florida concrete block plants and concrete block construction jobs. The officials expressed surprise and satisfaction with the job Florida block producers have done in manufacturing and promoting concrete masonry units.

N.C.M.A. officers in the group were George Katterjohn, president, E. W. Dienhart, executive secretary, and Glenn Barnes, vice-president. The officials were accompanied by Lewis Lloyd of New Orleans, John M. Harbert of Birmingham, Benjamin Wallace of Tampa, and Robert Sommers of Tampa. Their Florida hosts were M. E. Rinker, Charles Wilson, W. E. Cader Jr., and Edward Rowland.

The next leg of the nation-wide tour will take the group to Atlanta. Development of new and improved uses for concrete masonry materials is expected to result from this tour.

El Paso Building Material Co. Acquires New Brick Presses

The El Paso Building Material Co., El Paso, Tex., is now installing two new Jackson & Church 6-pocket brick presses, replacing two old German presses, and expects to increase production considerably, using the same Jackson & Church high-pressure kiln which has been in use for some time.

A volcanic cinder lime brick weighing 4 lbs. is produced, the cinder aggregate coming from a deposit near Las Cruces, N. M., jointly owned by T. R. Fye, president of the company, and J. P. Sheehan, president of the Atlas Lime Co., El Paso. The Las Cruces operation is known as the Volcanic Cinder Co.

With the old German machines, all of the brick products of the El Paso Building Material Co. were used for back-up work only, but the new product will be so superior that the brick can be sold for any use. Production of 20,000 a day is expected, as compared with 16,000 on the old machines.

Increased production at the cinder plant is in prospect also. Already the plant has a capacity of 12 carloads daily. Malcolm Smith is superintendent. Equipment includes a Caterpillar RD7 bulldozer, a Cedar Rapids crusher, and two 8-yd. International trucks.

Two New Ready-Mix Plants Opened by Omaha Concern

The Ready Mixed Concrete Co., 43rd and Nicholas Ave., Omaha, Neb., has set up two new plants in the city, one at 13th and Cass and a second at 36th and L streets, for better service to the Omaha and Council Bluffs area.

The firm, which is Omaha's original ready-mixed concrete products company and has been under the same management since 1929, also has augmented its delivery equipment with a number of standard end-dump trucks, Dumpcrete trucks especially designed for air-entrained concrete and truck mixers for mixing in transit.

The company is headed by L. C. Curtis, Fred P. Curtis, Elmer F. Rosengren, George R. Bathe and James J. McCaffrey.

Whelchel Burial Vault Co. Renamed by New Proprietor

A newly-formed concern which recently purchased the Whelchel Burial Vault Company at Lebanon, Ind., is doing business under the name of the Anderson Concrete Products Company.

In addition to vaults, the management is planning to manufacture other concrete products. Carl M. Anderson is president and owner.

Australian Pipe Manufacturer Visits Universal on U. S. Tour

F. L. Fitzpatrick, general manager of Rocla, Ltd., Melbourne, Australia, was a recent visitor at the Universal Concrete Pipe Company's offices, Columbus, O.

Mr. Fitzpatrick stopped at Universal during his tour of concrete pipe manufacturing firms. Rocla produces similar products. The Australian manufacturer is in the United States to study production and personnel methods.

Krause Brothers of South Chicago, Ill., have opened their new plant for the production of lightweight building units, window sash blocks, corner blocks and 4-in. partition blocks. Owners of the plant are Paul, Herbert, Louis and Edward Krause.

At Cedar Lake, Ind., the Cedar Lake Concrete Products Company began turning out concrete block some weeks ago under the management of Edward Spieler. Equipment includes automatic machinery of the latest type and a steam curing chamber.

• A closeup of reinforced concrete laundry tubs awaiting shipment in the yard of the Central Block Mfg. Co. • Right—The wire-reinforced tubs are poured in steel forms designed by the owner, Patrick Smith.

Ingenious Block Producer Profits from Steel Shortage By Making Laundry Tubs

Often the small operator who has a considerable amount of native ingenuity will solve a problem in a manner that may well bear imitation by some of the larger manufacturers. A case in point is the product and plant of the Central Block Mfg. Co., operated by one of our Canadian cousins in Chatham, Ont.

As a result of the steel shortage, plus the increase in the construction of residential units, a rather severe shortage of laundry tubs occurred in this area. Patrick Smith, owner and manager of the Central Block Co., designed and built a set of steel forms calculated to facilitate the production of reinforced concrete laundry tubs. That he succeeded is attested to by the accompanying photographs.

Not only has he succeeded in producing an acceptable substitute for the scarce steel tub, but it may well be that his tubs are so satisfactory that they will replace the steel variety in the local market permanently; certainly until the cost of steel retreats to a lower level than it now occupies.

The concrete tubs, when completed, have a very smooth finish, and their wire reinforcing tends to prevent cracking if reasonable care is exercised. Drains from each compartment of the tub join in an integrally-cast "Y" of cast iron, which can be joined to the domestic plumbing in the usual manner. The rim of the tub is protected from chipping, and the user from abrasions, by a stainless steel rim which is cast into the tub itself. In addition to serving a purely utilitarian purpose this rim has the additional effect of giving each tub a very neat appearance, when viewed in combination with the white concrete of the tub body.

The finished tubs are crated separately at the plant in substantial wooden frames, and are shipped extensively to users in the Chatham area. Customers report the substitute tubs to be highly satisfactory.

An additional product manufactured at this plant is a line of burial vaults of similar construction. Both of these products have found such a ready market here that block production has been temporarily suspended, due to the drains on the time of the regular labor force.

New York Firm's Floating Ready-Mix Batch Plant Serves Metropolitan Area

The Metropolitan Sand & Gravel Company of Port Washington, Long Island, N. Y., operates a floating ready-mixed concrete batching plant which was designed to be moved to various dock locations in New York City whenever a demand arose which could be most economically supplied in this manner. It can be moved from one location to another overnight. This plant was successful from the start when it batched concrete to truck mixers for a large Manhattan housing project. (See cut.)

The plant is supported on an old dredge hull 128 ft. long, 45 ft. wide and 12 ft. deep. The Blaw-Knox batching plant has four 75-cu. yd. aggregate compartments and two 250-bbl. cement compartments. It is supplied with material in the same manner as the company's three aggregate and concrete distributing terminals. (See PIT AND QUARRY, April, 1948, pp. 82-86.) Cement is pumped from l.c.l. containers on scows and aggregates are transferred from scows by a Northwest crawler crane on the barge.

Under the batching plant bin is a 6-cu. yd. Blaw-Knox weigh batcher from which the cement and aggregates are discharged on a 30-in. belt conveyor. This is mounted on a boom which is supported at its mid-point from an A-frame in such a way that it can be raised and lowered with the tide. A small chute on the dock end of the conveyor is used to load truck mixers. Deliveries are made by a part of the company's fleet of 30 Jaeger and 10 Chain-Belt 5½-cu. yd. truck mixers.

The air needed for this floating plant is provided by a 350-c.f.m. Jaeger compressor. The belts, hoists, etc., are driven by electric motors powered by a 75-kw. G.M. diesel-electric generator set.

Northern Concrete Products Co. Opens New $50,000 Block Plant

At Petoskey, Mich., a new $50,000 concrete block plant has gone into operation, replacing the original facilities of the Northern Concrete Products Company. A fire destroyed the first plant in 1946, causing a $30,000 loss to Norman Feather, owner and operator.

Today Mr. Feather's two sons, Orval and Marvin, are running the new plant, with occasional help from their father. Mr. Feather organized the business in 1936, and the first blocks were turned out the following year.

Hot Springs Firm Sells Plant To Mortarless Tile & Block Co.

Recently announced by the Economy Building Material Company was the sale of its property to the Mortarless Tile and Block Company at Hot Springs, Ark.

Extensive alterations are being made to accommodate new hydraulic machinery to be used for the manufacture of interlocking tile and block. The exclusive area franchise for the products is held by the firm. Meanwhile, production of standard concrete block is being continued.

Effingham, Ill., to Have New Ready-Mixed Concrete Plant

Completely automatic equipment is being installed at Effingham, Ill., at the C. J. Ready Mixed plant, which is expected to be in production within a month. Specification concrete mixes will be featured, according to C. J. Moritz, owner. Construction of the plant is under the supervision of K. W. Porter.

When the work is finished the plant will have an unloading capacity of four carloads per hour by means of a 1200-ft. belt conveyor.

Porter Named Vice-President Of Campbell Sons' Corp.

Robert F. Porter has been named vice-president in charge of concrete and building material sales for the Towson (Md.) plant of the Harry T. Campbell Sons' Corporation.

Mr. Porter, who has been associated with the company for the last 25 years, is vice-president of the National Ready Mixed Concrete Association.

G. P. Ducey Named Head of Washington Products Assn. At 19th Annual Meeting

The 19th annual meeting of the Concrete Products Association of Washington was held at Chevy Chase Inn on June 25 and 26, near Port Townsend.

Activities enjoyed after the directors' meeting on Friday night and the scheduled program on Saturday morning included golf, sailing, tennis, riding and swimming.

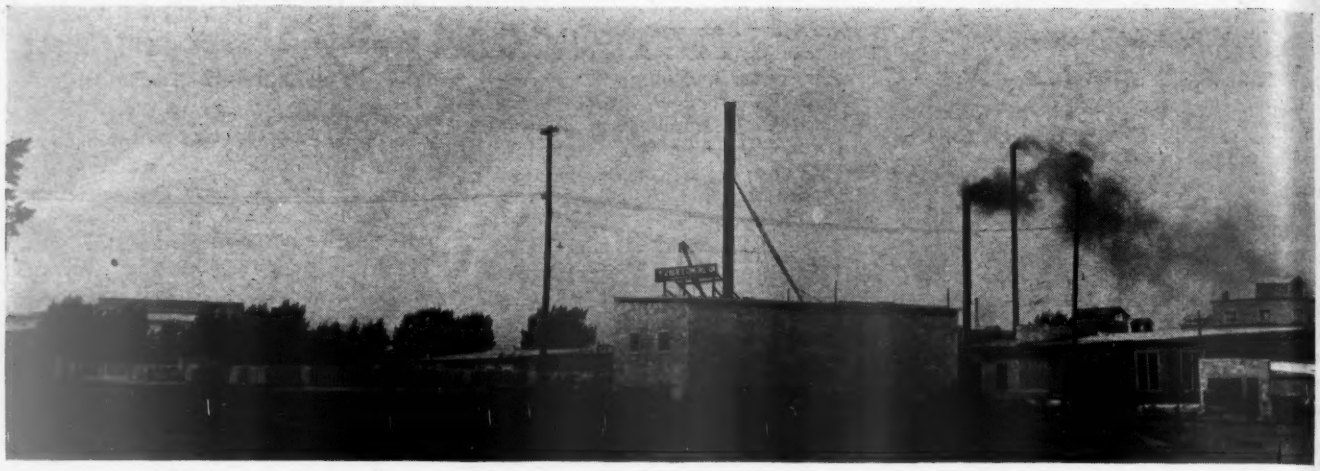
The attendance at the meeting was representative of the concrete products industry throughout the State of Washington. There were members from Spokane, Okanogan, Wenatchee, Grandview, Yakima, Bellingham, Everett, Centralia, Olympia, Tacoma, Shelton, Aberdeen, Puyallup, Bremerton, Port Angeles and Seattle.

Of especial interest on the program was a report by J. J. Wegner on the *Pumice Research Program* which is being conducted by Washington State College at Pullman.

W. G. Kaiser, manager, Farm Bureau, Portland Cement Association, Chicago, addressed the group on *Building Better Markets for Concrete Block*. He also led a discussion on concrete products.

Thomas P. Nash of Bellingham Builders Supply Company, Bellingham, the outgoing president, was held over as a director. Other new officers are: president, George P. Ducey, Associated Sand & Gravel Company, Everett; vice-president, A. B. Metcalf, Columbia Concrete Pipe Company, Wenatchee; secretary-treasurer, Talbot Campbell, Seattle Concrete Pipe Company, Seattle; director at large, H. C. Lutes, Layrite Concrete Products, Spokane.

Missouri Builders Supply Company officials at Boonville, Mo., have announced that they will produce ready-mixed concrete for users in this area at their new plant. Modern equipment has been installed for the production of specification mixes. W. M. Clinkscales is the owner and operator of the plant.



• The main plant and storage yard of the Aerocrete Construction Company, Ltd., Montreal, Canada.

Canadian Construction Firm Specializes in Lightweight Precast Concrete Work

another ON THE SPOT report

For more than a score of years the Aerocrete Construction Company, Ltd., of Montreal, Canada, has been engaged in the production of precast concrete units of various types, in 80 percent of the work us-

By WILLIAM M. AVERY

ing a cellular concrete which itself bears the name Aerocrete. According to the company's description, the material is made from a cement, sand and water mortar into which very small air cells are introduced in greater or smaller quantity at will, so that the density may be varied from 40 lbs. per cu. ft. up to the weight of ordinary concrete. In addition to being unaffected by exposure to moisture or to the elements, Aerocrete is said to have excellent insulating and acoustical properties which makes it especially suitable for floor and roof slab construction. No special equipment or materials are required in its production.

Precast Aerocrete units are usually shipped from a central producing plant, but for remote projects of sufficient size the company sets up a temporary plant near the site for producing precast floor and roof slabs, beams and joists, Aerocrete well blocks or ordinary concrete blocks. Other classes of work handled include poured-in-place roofs and floors, floor fill, roof grading and insulation, precast and poured-in-place fireproofing, and special precast shapes in both Aerocrete and heavyweight concrete.

Aerocrete owns and operates plants at Montreal, Toronto and Vancouver, and in addition has sales offices at Ottawa and Quebec. At the Montreal plant, where the accompanying photographs were taken, about 100 men are employed in the production of roof and floor slabs, joists, cinder blocks and other items.

The plant has a capacity of about 50,000 sq. ft. of slabs per week. Precast beams, blocks, *et cetera,* are in addition to this capacity. The continuous production-line arrangement used is somewhat similar to the practice followed in most of the Flexicore plants in the United States. The molds move through the plant on small rail cars, two molds to a car. There are four parallel lines of track, each approximately 130 ft. in length, three of which are enclosed on the sides and have hinged covers to form shallow curing kilns. The fourth is used for assembling the molds, oiling, placing end gates and reinforcing steel and similar preparation activities. The molds are shuttled from one track to another on transverse tracks which enclose the production area at either end. One transverse track is used for shuttling empty molds to a concrete chute where they are filled from a mezzanine-floor mixing station. Screeding off and finishing

(Continued on page 132)

• Left: Filling a concrete roof slab double form. The forms are of all-steel welded construction.

• Right: Aerocrete has expanded above the forms and is ready for trimming off. Note the sloping roofs of the curing room, counterweighted for raising and lowering.

Need a Cupful of Concrete? You Can Get It—If You Live in Atlanta

another ON THE SPOT report

A SMALL central-mix concrete plant operated by the City of Atlanta, Ga., is providing a unique and apparently wholly satisfactory service for utility operators and property owners at (believe it or not!) not one penny of cost to tax payers. The plant furnishes at cost any amount of concrete from a hat-

By WILLIAM M. AVERY

ful to several cubic yards for making driveways, for general home repairs, and for replacing street and sidewalk sections removed by utility crews in the course of their operations.

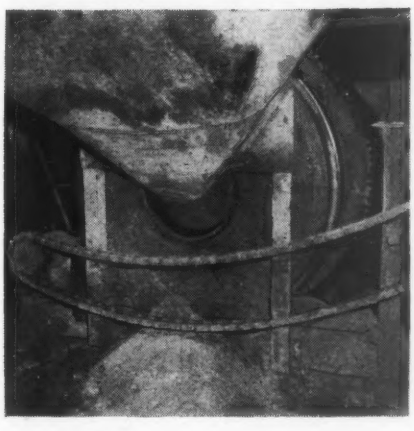
The popularity of this unusual service is evidenced by the fact that since its inauguration some four years ago all the local utility companies have disbanded their own concrete repair crews, and now rely wholly upon the city to supply their requirements. Equally hearty endorsement by home owners is evidenced by the number of private driveways for which concrete is furnished—an average of eight for each working day. In all cases the company or individual ordering the material pays for exactly the amount he uses. Due to the scale of the operations and their non-profit character, costs are quite nominal in comparison with normal charges for batching, mixing and placing small amounts of concrete.

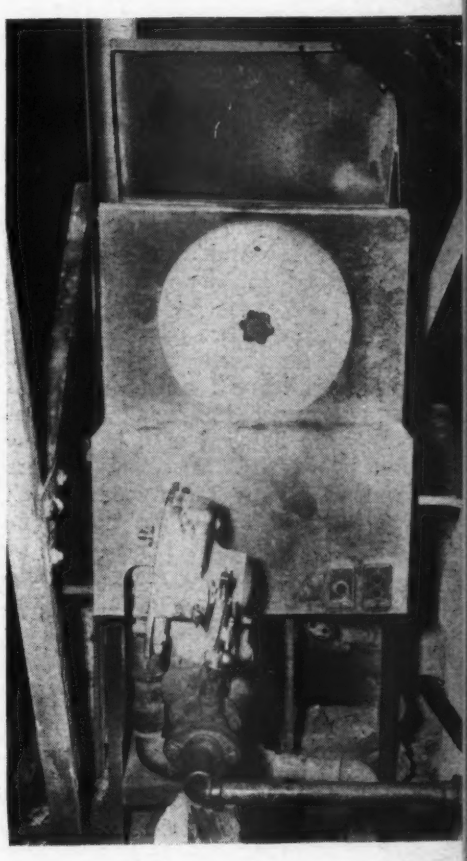
The method of operation, which is tailored to meet the varied needs of those who use the service, is unique in our experience with ready-mixed and central-mixed concrete handling practice. The batching and mixing plant is a conventional Butler Bin design, with two 5½-cu. yd. bin compartments for sand and crushed granite. Since bagged cement is often required on the various job sites, it is also used at the plant to avoid having two handling methods. The bags are trucked to the plant from a nearby warehouse, opened and dumped into the boot of an elevator which discharges inside the batching plant. The warehouse will hold up to six cars of bagged cement.

• One of the trucks loading at the batching plant of the City of Atlanta, which turns out an average of 50 cu. yds. of concrete per day for small repair jobs in the Atlanta area. The tank at the left is for mixing a cement dispersing agent used in all batches.

High-early-strength cement is used exclusively. To each half-yard batch 3 lbs. of Pozzolith is added in solution to obtain the high degree of workability which is absolutely essential in operations of this sort, and to prevent the aggregate from segregating in transit. The latter consideration is especially important since the concrete is hauled in ordinary dump bodies, and the interval between mixing and placing is frequently as long as three hours. The Pozzolith is mixed in a 200-gal. tank adjacent to the batching plant and pumped automatically to a dispenser which delivers the required amount of solution. Additional water required in the mix is measured with a Neptune meter.

The aggregates used are sand and crushed granite, the latter produced





• Left: The materials (crushed granite, sand and high-early-strength cement) are batched by weight and mixed in this ½-cu. yd. drum mixer.

• Right: An automatic dispenser measures out the correct amount of the cement dispersing solution required for each batch. The meter in the foreground is used to measure the water.

• Cement bags are opened and dumped into the boot of an elevator which discharges inside the batching plant.

by prison labor in a nearby Stone Mountain quarry. Adequate reserve supplies are kept in open stockpiles on the plant yard. A P & H Model 206 crane is used for loading the top bins.

Because of the nature of the work, a relatively small amount of water is introduced into the mix at the plant—usually around 5 gallons to a ½-cu. yd. batch. When necessary more water is added on the job, and the mix is agitated with shovels. Except in driveway pouring operations, in which standard mixes are used, most of the concrete is tamped in place.

About 40 1½-cu. yd. loads go out of the plant every day. Each truck (there are 10 in operation, each averaging 4 trips per day) has a crew of two men in addition to the driver. The operations are planned and scheduled with the utmost care in order to prevent excessive delay in placing the concrete after it leaves the plant, but even with the best planning the time lapse may be as long as three hours. An average placement for repairing a sewer cut or a section of sidewalk requires around half a yard of concrete.

Robert L. Cornett is the operating engineer in charge of the plant. When we interviewed him, he pointed out that the city's activities are not in any respect competitive with the operations of regular ready-mixed-concrete producers, who still supply all the large jobs in the Atlanta area. The city plant, according to Mr. Cornett, is purely a service set-up designed to take care of requirements too small for the average commercial ready-mix plant. Notwithstanding the size of individual jobs, however, the city's operations average about 50 cu. yds. per day, a fact which seems to indicate that the service fills a basic need in the Atlanta area.

Canadian Construction Firm

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are done after the molds are in the kilns, after which the counter-weighted doors are lowered and the steam is turned on. The curing cycle varies somewhat with the season of the year, but on an average the units are steamed for about six hours at 100 deg. F.

The mezzanine-floor level which overlooks the slab plant is used for both mixing and aggregate storage. Aggregates are delivered by truck and stored in piles on the floor. There are five mixers in all—two for the slab plant, two which serve the block plant directly below the mezzanine, and one for beams, located in a separate building. The materials are batched both by volume and by weight. Wheelbarrows are used to charge the mixers, which are located below the mezzanine floor.

Aerocrete was in some measure forced into the block business by the unprecedented post-war demand for masonry units, and block production is still not regarded as an integral part of the company's business. There are two Stearns tamper machines which are operated alternately to produce about 15,000 units per month. Most sales, which include 4-, 6- and 8-in. cinder units, are for backup and partition work.

Depending upon its unit weight, Aerocrete may have an ultimate compressive strength ranging from 300 to 1,800 p.s.i Slabs made of the material are 12 in. wide and are made in thicknesses of 3, 4 and 5 in. for spans of 4½, 8 and 11 ft., respectively, where superimposed loads do not exceed 50 lbs. per sq. ft. Normally a 4-in. slab weighs about 23 lbs. per sq. ft., but for special cases the cellular structure of the concrete can be controlled to reduce this weight by 25 percent. To transmit accidental concentrated loads, key joints between the slabs are filled with Aerocrete grout after the roof has been erected. This provision also makes it possible to cut holes up to 11 in. in diameter in the slabs without installing extra steel framing, since the grout keys effectively transmit loads from one slab to another. For roofs in which no insulating properties are necessary, the company makes lightweight channel-shaped slabs which are only about 1 in. thick at the center.

• Aerocrete slabs used as the setting for the 125-hp. boiler.

Aerocrete Construction Co. also supplies precast concrete beams for use with its slabs, and claims that structures so built are cheaper in particular cases, and take less time than conventional concrete designs. For one job, in which over a million square feet of Aerocrete slabs were used, 6,785 precast concrete beams were supplied. They measured 5 in. wide by 25 ft. long. Design, manufacture and erection are all handled by the same company.

George E. Fekete has been named district sales manager at St. Louis, Mo., by the Lone Star Cement Corporation, Indiana Division.

Dutch Use Precast Slabs for Wide Range of Paving Jobs

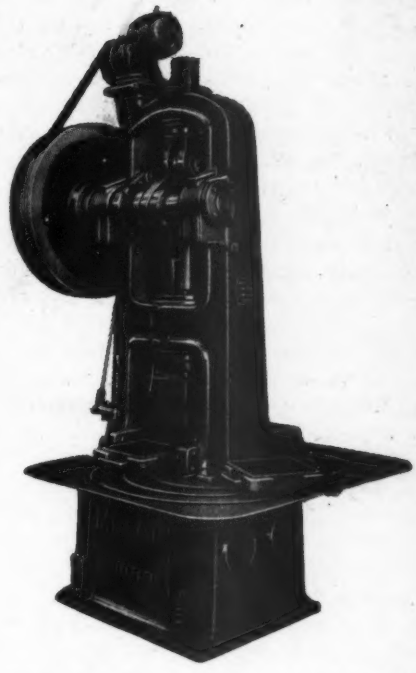
Since the close of the war there have been a number of reports published in the press indicating that our overseas neighbors are several jumps ahead of us in the development and exploitation of certain types of precast concrete products. One sizeable item in this category is precast paving slabs, which to our knowledge have never found even a minor market here in the United States. According to information which we have just received from P. F. Van der Meulen Bosma of Algemeene Beton-Industrie in the Netherlands, about 80 percent of all sidewalks in that country are paved with precast slabs. Prewar production averaged 33,000,000 units per year.

The most widely used type measures 30 by 30 cm. (approximately one foot square), and is produced in thicknesses ranging from 1¾ in. to 4 in. Their most extensive use, apart from sidewalks, appear to be in the construction of bicycle roads, railroad station platforms, loading docks, restaurant terraces, and for paving the floors of garages, warehouses, barns and workshops. Where foot traffic alone is involved, the units are made with a ¼-in. chamfer on all four sides. Plain units are usually specified for wheel traffic.

The wearing surfaces are at least ¼ of an inch thick, and are most commonly made of sharp sand and fine graded rock or gravel with a maximum size of ⅛ to 3/16 of an inch. Crushed quartz, carborundum, and slag are also used to some extent. For applications involving heavy loads on small wheels, there are special patented slabs with a wearing surface consisting of 3/16-in. pressed steel sheets. The body of the slabs below the wearing surface usually consists of sand-and-gravel concrete in which the maximum size of the coarse aggregate is limited to one inch.

In all processes the slab units are made face down on plain pallets. The steel mold boxes, weighing approximately 220 lbs. when filled with concrete, are most commonly handled on a turn table, although several alternate methods have been developed. The procedure is to spread the wearing surface mix on the pallet with a trowel and then fill the mold box with normal concrete, which is screened off with a special hand tool. When the screening is done properly it is said that the finished slabs never vary more than 1/16 of an inch in thickness.

There are three methods in use for compacting the concrete; pressure, involving the use of large hydraulic presses with working pressures up to 500 tons; impact, accomplished with drophammers weighing approximately 1,000 lbs.; and vibration. In each of these methods the concrete is covered with a steel top plate before compaction begins. In the vibrating technique, which is a postwar development, a very heavy top plate is used so that the vibration will be carried out under pressure. Top production on either the drophammer presses or the vibration machines ranges from 150 to 200 slabs per hour. Output on the hydraulic presses is considerably less. The slabs are stripped immediately and loaded by hand onto narrow-gauge rail lorries or racks for curing.



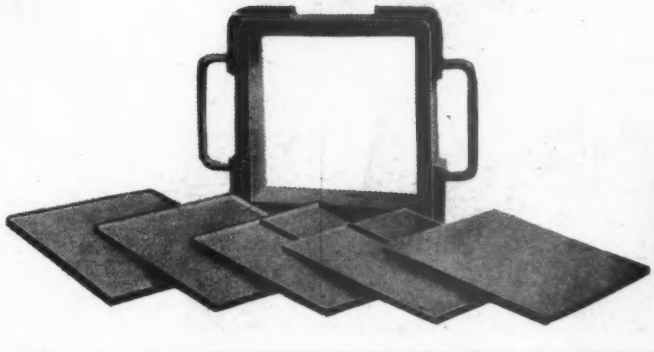
• Drophammer machine used to compact paving slabs.

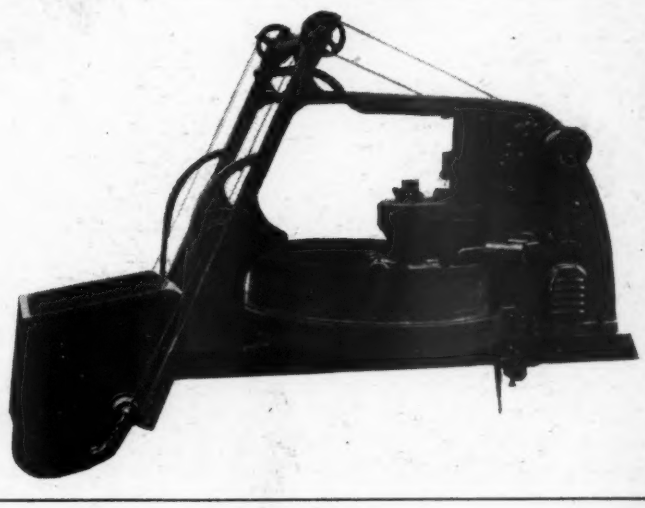
Our correspondent neglected to supply details with respect to curing conditions, but it seems probable that the prevailing practice would involve little more than moist storage. Cube crushing strengths as high as 16,000 p.s.i. are attained in what are designated as "super quality" slabs. Ultimate bending strength under a single load applied at the center of a 20-cm. span ranges from 4,800 to 5,500 lbs. on slabs 1¾ in. thick. A 30- by 30-cm. slab of this thickness weighs approximately 20 lbs.

Slabs of special design are made

(Continued on page 134)

• Left: Steel mold and pallets of the type used in slab production.
Right: Skip hoist and tub-type batch mixer.





Publicity Know-How Pays in Concrete Business

By D. Markstein

"LOOK at that," wailed the manager. "Jones Concrete Company is in the news again. The free publicity those guys get! Why don't the reporters ask us something sometimes? Why can't we get our name in the papers?"

Why not? "Free publicity" doesn't just happen. It is the result of careful planning and football-team-precision execution of a program as thorough as that used for any selling operation.

Publicity isn't by any manner of means a substitute for advertising. Rather, publicity and advertising are—to use the football simile again—like a speedy halfback and a sturdy blocking back. The halfback gets the results, in the form of touchdowns, but the unsung blocker contributes in large measure to his success. Advertising and publicity are best *teamed*, advertising making the sales, with publicity helping to pave the way by making friends for the concrete manufacturer.

Planning for a publicity program might break down into five phases: *what* publicity to get out, *where* to send it, *whom* to cultivate, *when* to break a story, and *how* to insure publication.

Taking the first phase, just what is a publicity story? What is good publicity—or is any publicity good?

A publicity story is not only one which does a direct selling job for the concrete manufacturer, but any story which indirectly tends to put him in a favorable light. For example, a newspaper story about one unusual worker and the way he performs his job helps indirectly to build good will through the reaction of readers who say to themselves, "That's a good place to work—treats its employees well."

To the old fashioned press agent, any publicity, good, bad or indifferent, was desirable as long as it included his client's name. The modern public relations specialist thinks otherwise. Sometimes, in fact, his job is to prevent, in so far as it can be done, the publication of articles and stories which reflect unfavorably upon his company. The aim of a company publicity program is not to put the concrete manufacturer's name before the public in *any* way. Rather, it is to present the company in a favorable light.

Newspapers and radio programs offer excellent outlets for consumer publicity. It is usually wise to cultivate key men—editors, announcers, and radio program directors. Contrary to prevailing opinion, most newspaper editors are eager to receive publicity, provided they are not expected to insert free advertisements in their news columns, and provided the publicity gives them something of real news or human interest value.

When something pops at the company that might be newsworthy, pass it on to *newspaper editors*. Get to know them personally; let them understand that you are eager to help them in securing facts, figures and human interest material they need, regardless of whether a story of value to the company develops.

It is axiomatic in the news-gathering business that there is nothing older than yesterday's news. So if something of immediate news interest does develop, don't sit on it. Release it *while it's hot*.

To get cooperation from publication bosses, it is necessary to *give cooperation*. Ferret out the news for them. For example, getting back to the worker whose job, personality or past history may be unusual, it is wise publicity to "package" a story for the local media. Follow up the information. Interview the man. Get pictures. Present the whole, in a unit, to the editor.

If no trained publicity man is on the payroll to take care of this chore, call the editor of a local newspaper and give him an outline of the story, letting him know that if he cares to send a reporter to follow up your tip, the company will extend all the aid it can. There are hundreds of unwritten human interest stories floating around all the time that editors can't cover because they don't know about them. Tips and active help in following up such feature material are appreciated.

Don't expect the editor to give a glowing account of the company in return for all this. Consider a casual mention of the company—so long as it presents the company in a favorable-angle story—ample compensation.

Stunts often help to focus news interest on a special promotion. But stunts can be overdone. To be effective, they must tie in directly to the genuine news value of the story as it will be developed by the publication.

A picture, many editors believe, is often worth a thousand words and, in any case, a story that is well illustrated stands a better chance of being used than an un-illustrated article. In furnishing pictures for publication, it is wise to be sure they have action and human interest. People like to look at people, and action attracts a reader's (and an editor's) eye.

If the story is furnished ready-written in release form to the publication, it is vitally necessary that "slanting" be eliminated. It must be written as the reporter himself would write it, without selling plugs or superlatives.

Dutch Use Precast Slabs

(From page 133)

for a wide range of uses, indicating that a considerable amount of both imagination and ingenuity has gone into exploiting the possibilities of precast concrete. Tree slabs, used around trees in sidewalks, contain perforations which allow air and moisture to reach the roots. "Drainata slabs," consisting of very porous jolted concrete, are used on terraces of restaurants and hospitals to expedite the run-off of rain water. Bicycle parking blocks contain special grooves which enable riders to park their machines in a vertical position. Talking pavements, in which advertisements are spelled out in brass letters inserted in the wearing surface of the slabs, have been developed to a high degree. White, black and yellow slabs are used in busy thoroughfares to mark pedestrian lanes and loading areas for street cars and buses. Special tongue-and-groove units, called "Diabool slabs," are also produced for heavy traffic conditions encountered in factories and workshops.

It is probably debatable whether precast slabs could ever be developed to a similar extent in the United States, but it seems safe to say that nobody has made any very serious effort in that direction. In any case, the practicability of precast slabs on this side the pond is beside the point. We could use a lot more of the same kind of imaginative development and promotional work than appears to be in evidence at present.

Atchison, Kan., added another industry, when the Land Construction Company's ready-mixed concrete plant began operations recently. Associated in the venture are the following: Frank E. Dawkins, manager; Louis Brockett, office manager; Gus Hillix Jr., in charge of the plant; Marvin Richardson, in charge of construction.

Amarillo Plant of Chase & McGinnis Features Popular Scoria Blocks

another ON THE SPOT report

NOTABLE among those who are contributing to the rapid economic growth and development of the great Southwest is John S. Chase, one of the leading producers of concrete pipe, concrete block and other concrete products in this country. Starting with the Chase Building Products Co., with concrete products plants at Fort Worth and Dallas, Tex., of which he is president, Mr. Chase is now also an officer and part owner of the Bayou Concrete Products Co., Houston, and Chase & McGinnis, Inc., with plants at Abilene, Amarillo and Waco. The Chase & McGinnis firm was formed in March, 1946, to take over the Amarillo, Abilene, Waco and Houston pipe plants of the Universal Concrete Pipe Co. Most of these have since been expanded and new equipment added. All except the Houston plant make both pipe and block.

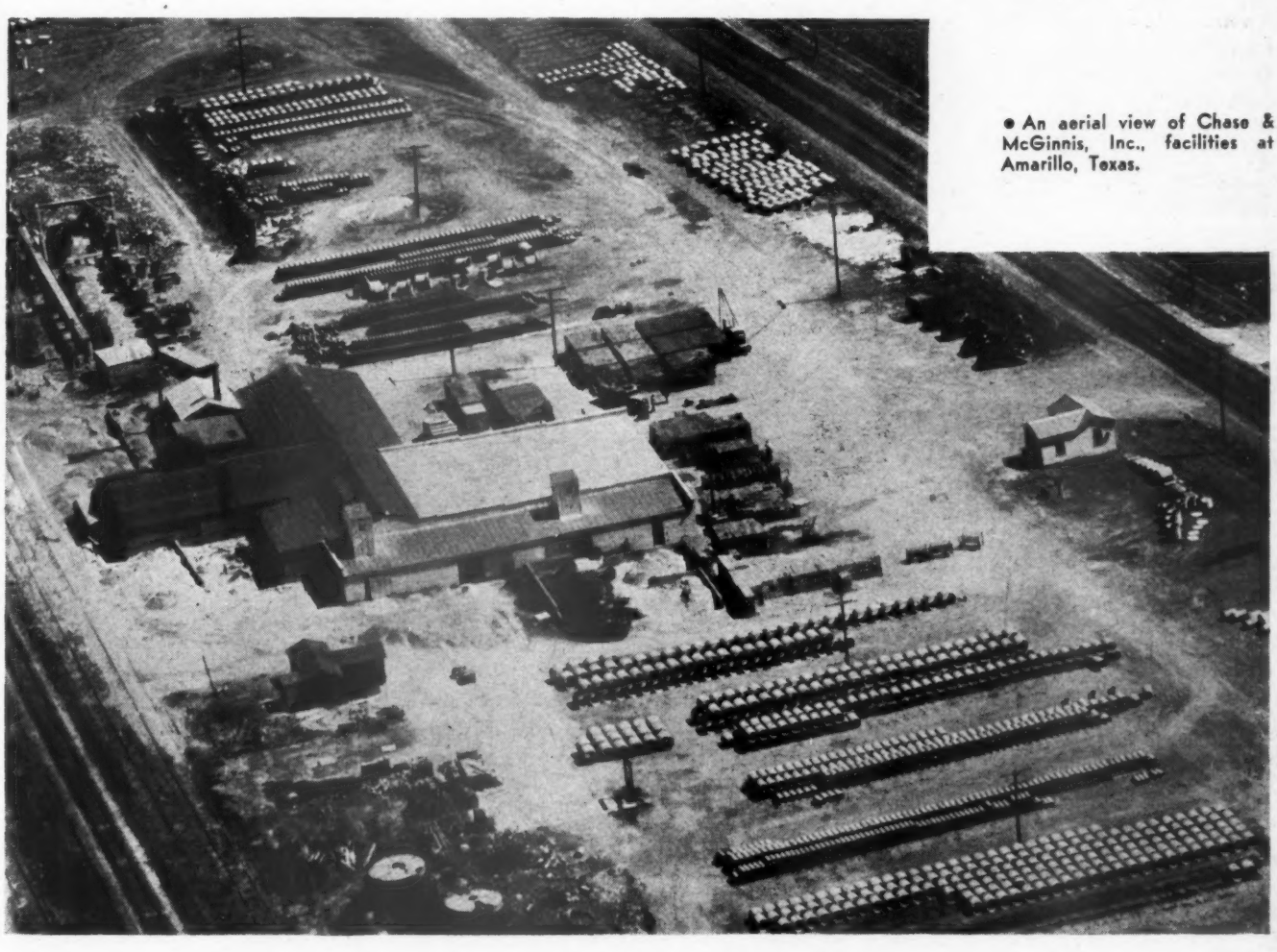
Affiliated with Mr. Chase in the Chase & McGinnis firm as president and co-owner is T. D. McGinnis, a retired highway and railroad contractor. The Amarillo plant, with which this article is concerned, is supervised by R. C. Carhart, engineer for the company. A. J. Haverstick is assistant manager and Hewey Rumbaugh is plant foreman.

The section of the Panhandle in which Amarillo is located is one of the fastest growing in the state, due mainly to recent irrigation projects which have made possible the growth of general feed crops and wheat. The oil boom has also helped. This area at one time depended entirely on cattle raising, which is still important but agriculture is taking the lead and the area is also developing industrially. An indication is the growth of Amarillo from a population of 45,907 in 1930 to 51,686 in 1940 and over 75,000 now.

The Amarillo plant was built by Universal before the war and when taken over had a Universal 6- to 36-in. pipe machine and a Stearns "Clipper" stripper block machine. Since it was taken over, another Clipper block machine and a Dixon packerhead pipe machine for 4- to 10-in. pipe have been added.

This plant makes both sand-and-gravel and scoria blocks in 8- by 8- by 16-in. and 5- by 8- by 12-in. sizes, and the necessary special blocks and fractions. Scoria is a local volcanic cinder which is purchased from the Panhandle Scoria Co., Channing, Tex. It is crushed and screened before shipment. This makes a 29-lb. standard block of high insulating value, which meets A. S. T. M. specifications. In spite of the availability of good and cheap sand and gravel locally the trend is definitely toward scoria block, which already forms more than half of the total output. The 2-cent premium in price is no deterrent especially when delivered to distant points where the lighter weight permits more blocks to be hauled per load.

Most of the block is used for in-



• An aerial view of Chase & McGinnis, Inc., facilities at Amarillo, Texas.

• A general view of the plant with some of the smaller sizes of pipe in the foreground.

dustrial, residential and farm construction. Scoria blocks are used for all types of walls and are plastered over.

The concrete pipe business is secondary at this plant as much business is still being lost to clay pipe because of its greater sulphate resistance. For this reason little sewer pipe is sold. Much of the output consists of heavy ball-and-spigot pipe made to railroad specifications for culverts. Most of the other pipe is for railways, highways, irrigation, etc. Sand-and-gravel aggregate only is being used in the pipes with air-entraining cement. The use of this cement in both pipes and blocks has a tendency to make the concrete more rubbery and less likely to break. As the semi-dry mix has no slump the increased workability is not important.

All handling of the aggregates is now being done with wheelbarrows which serve as volume batchers, but mechanical handling and weigh batchers are to be installed. Cement is handled in sacks. Each pipe machine has its own mixer and elevator and a third system serves the two block machines. All products are steam cured for 12 hours. They are then yarded and the pipe sprayed for seven days (blocks, three days). Chase racks, an Erickson lift truck and Barrett jacklifts are used for handling the blocks and carts for the pipes.

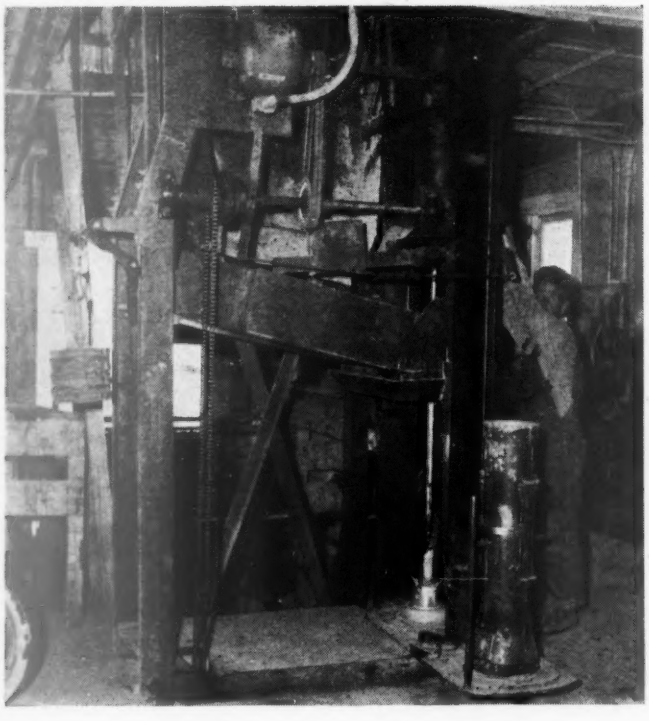
Universal pipe forms are used and 18-to-72-in. pipe 6 ft. long can also be cast and vibrated in the yard, using Syntron electric vibrators. An overhead electric crane is used for loading heavy pipe for shipment. Shipments of block and pipe are regularly made as far as 150 miles.

The Graystone Concrete Products Company's plant at Seattle, Wash., recently resumed production after the adjustment of labor difficulties which had caused a six-week shutdown.

• Left: Left to right: R. C. Carhart, plant manager; Mrs. Frances Hargett, clerk; Henry Rumbaugh, plant foreman; A. J. Haverstick, office manager.

• Below, left: the packerhead pipe machine used for 4- to 10-in. pipe.

• Below, right: The stripper block machine which produces standard block.



Mumford Named President Of Ohio Ready Mixed Assn. At Meeting in Cleveland

At its annual meeting in Cleveland on June 24, the Ohio Ready Mixed Concrete Assn. elected R. P. Mumford (Beckley & Myers Co.) to the office of president. Other officers chosen for the forthcoming year are Paul Hunt, vice-president and Stephen Stepanian, treasurer. C. Pearson, Sam Crew and F. W. Sloter were elected directors.

In opening the meeting, Ralph H. Anderson, retiring president, urged the members of the association to give serious thought to their responsibilities and problems in respect to public relations. Of first importance, Mr. Anderson said, is the reaction of municipalities to concrete trucks on public roads.

In his report as secretary of the association, Claude S. Clarke commented on recent and current legal developments in the State of Ohio. He said that despite the state's failure to achieve united action on a long-range road program, increased home and municipal building have helped to maintain a high level of production in the ready-mix field.

The discussion period was opened by V. P. Ahearn, Executive Secretary of the National Ready Mixed Concrete Assn. In endorsing Mr. Anderson's appraisal of the importance of good public relations, Mr. Ahearn pointed out that ready-mix producers all operate on public sufferance. Commenting on the recent Supreme Court ruling on the basing point system in the cement industry, the speaker stated that the adoption by that industry of a 100 percent mill price selling basis would seriously affect most producers of ready-mixed concrete.

As guest speaker at the luncheon meeting, Mr. Ahearn commented on the continued shortage of freight cars and the steady rise in freight rates. With another increase due in rates before the end of the year, there is at present no prospect of relief in sight, he said.

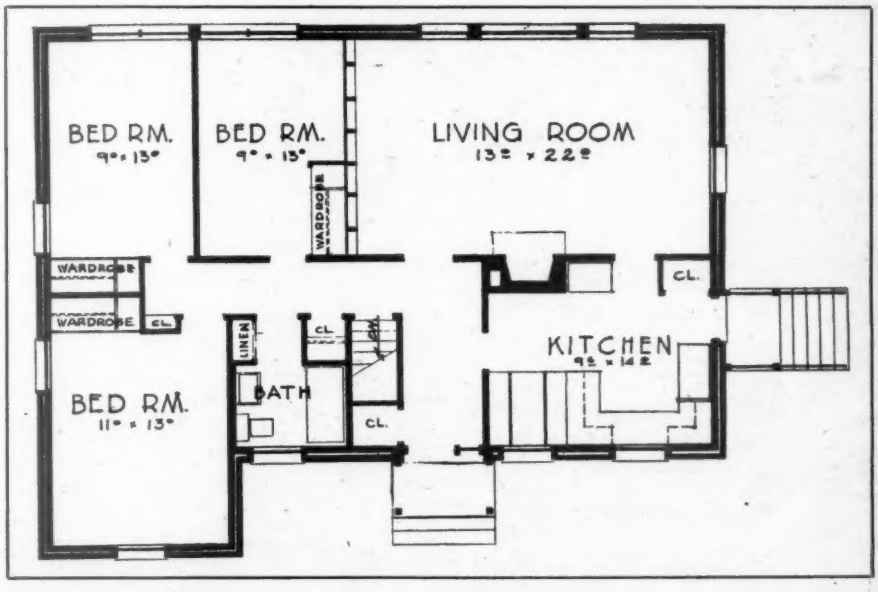
Plasticrete's Security Home Lures Throngs of Home Builders

An excellent example of top-notch promotion by a block manufacturer is the "Security Home" sponsored by Plasticrete Corporation of Hamden, Conn. Specifically designed to demonstrate the advantages of cavity-wall construction using Plasticrete units, the home was visited and inspected by more than 19,000 prospective home builders during a month-long open house, prior to its occupancy by one of the company's officials.

Four-inch colored ashlar units were used for the exterior shells of the walls, with a 2-in. dead air space and standard 4-in. units making up the 10-in section. Descriptive folders handed out to the visitors emphasized the high insulative protection inherent in this type of construction, permitting direct plastering to the interior wall without furring and lathing. Floors in the residence were constructed with Plasticrete filler blocks and concrete joists. Radiant heating is supplied by copper coils placed in the floor. The descriptive pamphlet points out that from foundation to chimney cap the "Security Home" is built for permanence—to support, to insulate, to withstand all the elements that can attack.

The home, which is in the $15,000 class, was designed by Carl R. Blanchard, Jr. Sixteen local firms cooperated with Plasticrete in making all phases of the structure harmonious and representative of the very latest and best practices.

• Floor plan of the "Security Home" pictured below, an exhibition feature sponsored by the Plasticrete Corporation.



• Left: A "Security Home" built of 4-in. colored units produced by Plasticrete Corporation.

Lightweight Aggregate Produced in Modern Plant By Lehigh Materials Co.

Lehigh Materials Company, a subsidiary of the Lehigh Navigation Coal Company, Inc., will soon be in production of a quality lightweight aggregate at its new, modern plant near Tamaqua, Pa.

The trade name of this newcomer to the lightweight aggregate field is "Lelite." The base of Lelite is slate and coal, high-standard raw material.

It is expected that the yearly output will be 125,000 tons.

A.C.P.A. Executive Committee To Meet in Colorado Springs

The Broadmoor Hotel, Colorado Springs, Colo., has been selected for the regular business meeting of the executive committee of the American Concrete Pipe Association, as announced by Howard F. Peckworth, managing director. The meeting will be held October 22 and 23.

J. A. Dunn, Swampscott, Mass., president, will conduct the discussion of routine business matters and the joint meeting of board members and the Technical Problems Committee. The T.P.C. will report on progress of the hydraulic studies now under way at the St. Anthony Falls Hydraulic Laboratory, University of Minn. This is a joint project of the A.C.P.A. and the Portland Cement Association.

Final plans for the 41st annual convention of the association will also be discussed. It is planned for Richmond, Va., March 3 through 6, 1949.

Members of the executive committee include George Denham, Faulkner Concrete Pipe Company, Hattiesburg, Miss.; H. W. Heath, Lock Joint Pipe Company, East Orange, N. J.; Elmer L. Johnson, Concrete Conduit Company, Colton, Cal.; and Edward Fox, Cincinnati Concrete Pipe Company, Cincinnati, O.

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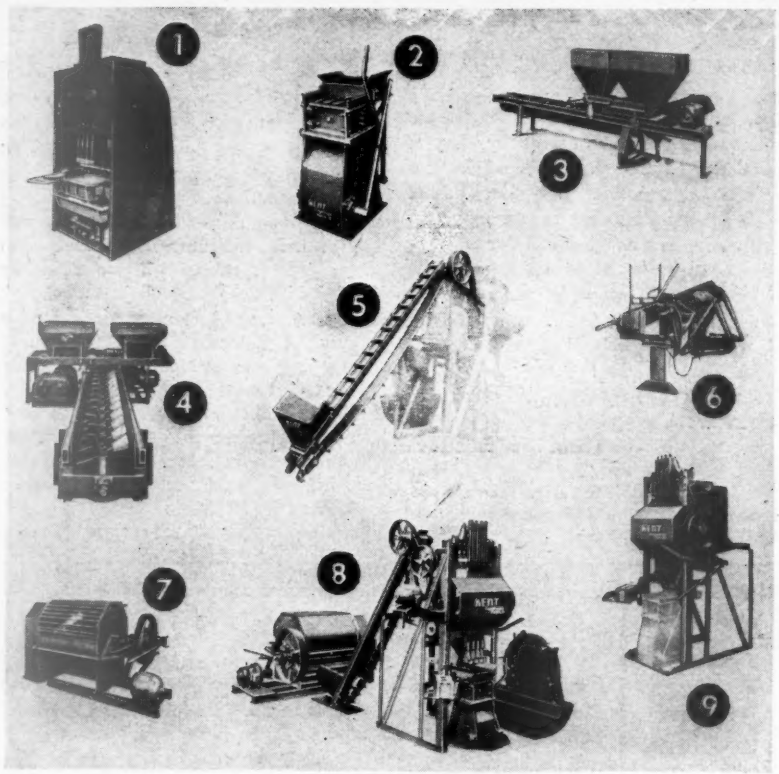
KENT *Coordinated*
MACHINERY



1 KENT Vibra-TAMP BLOCK MAKER
2 KENT STRIPPER
3 KENT Continuous MIXER
4 KENT Stediflo MIXER
5 KENT Concrete ELEVATOR
6 KENT LINTELator
7 KENT Batch MIXERS
8 Complete KENT Packaged BLOCK PLANTS
9 KENT TAMPER

Write for Illustrated Literature on Any of These Machines

The KENT MACHINE COMPANY
Manufacturers of CONCRETE PRODUCTS MACHINERY *Since 1925*
CUYAHOGA FALLS, OHIO, U.S.A.

NEW MACHINERY and SUPPLIES

● Computing Scales

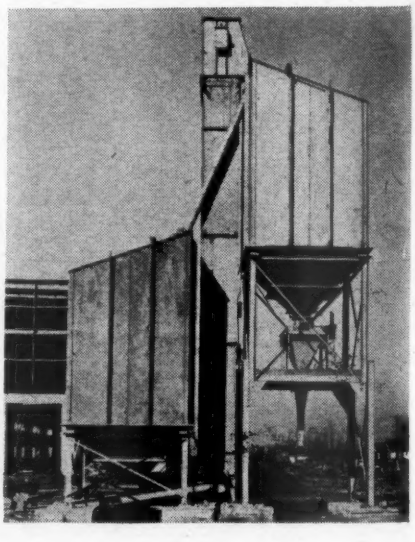
Precision Instrument Sales Co., 532 Paul Brown Bldg., St. Louis 1, Mo., has developed "Time Saver" drafting and computing scales for modular concrete masonry units. The scales are made 12 inches long on either vinylite plastic or plastic-treated card stock, are designed to facilitate drawing units on elevations or details, to help in calculating detail dimensions accurately, and to avoid unnecessary cutting on the job.

The five scales included in the set may be used for making either ⅛-in. or ¼-in. scale drawings, or details to ⅜, ½, ¾, 1, 1½ or 3 inches to the foot. They may be taped under the draftsman's T square so that lines may be quickly drawn to the various scale markings. Their use is said to save half of the time ordinarily required for computing, and more than a third of the time usually spent in drawing masonry units on elevations.

The scales are offered in quantity to concrete block manufacturers for distribution by them to the drafting rooms of architects and builders. Each side of each scale can be imprinted with two lines of advertising in 8 pt. type or one line in 12 or 14 pt. A 15 percent discount is offered to members of the National Concrete Masonry Assn.

● Portable Batching Plant

Blaw-Knox Company of Pittsburgh, Pa., has begun commercial production of its newly developed portable bulk cement batching plant featuring improved portability and the use of an auxiliary bin. The provision for use of an auxiliary bin permits easy and economical expansion of capacity. A long undertrack screw feeder enables either the immediate or eventual installation of a low-level auxiliary bin on the car unloading side of the elevator. An overflow chute passes cement from the main or batching bin to



the auxiliary bin. The latter has a slide gate for passing material to the screw feeder and thence by elevator to the main bin.

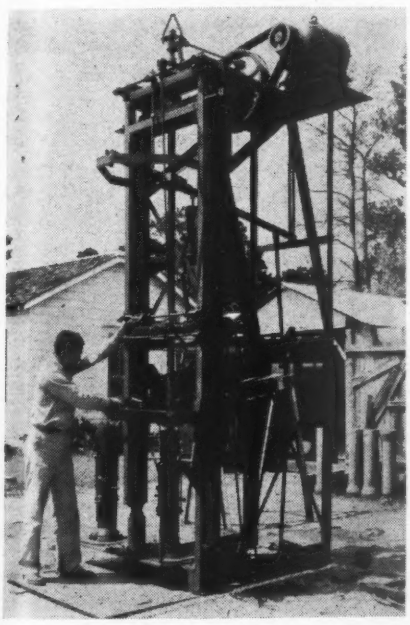
The entire bin section is a one-piece welded assembly. The cement weighing batcher is supported from the steel platform framing of the middle unit, which is also shipped and erected in one piece. A vertical enclosed-type bucket elevator rated at 50 t.p.h. and a 9-in. screw feeder serve the plant. Auxiliary and main bins are of the same design and are furnished either in 200-bbl. or 400-bbl. sizes, with total plant storage capacities of 200, 400, 600 or 800 barrels.

As as result of the design, it is possible to erect a 200-bbl. main bin with long screw feeder and provide for eventual expansion to 400 or 600 barrels through the addition of the appropriate auxiliary bin. An initial 400-bbl. plant may likewise be expanded to 600 or 800 barrels in total storage capacity through the installation of a 200- or 400-bbl. auxiliary bin.

• New Pipe Machine

Improvements in the Dixon pipe-making machine, formerly designed to make 6- to 12-in. T. & G., and 4- to 10-in. B. & S. pipe, now produces 12-in. B. & S. as well.

The improved model has reinforced channel beams and X-braces, which



strengthen the unit and reduce vibration. This lowers maintenance costs and increases the life of the machine. New, larger outriggers, which accommodate the larger jackets, remain easy to swing into position.

Another addition to the improved machine is a rigid mounted turnbuckle, which permits fine adjustments of the bell-packer.

Reports indicate the machine to be thoroughly dependable, producing more than 80 3-foot joints of 4- to 12-in. pipe per hour. Houston Concrete Pipe Company, 6600 Washington Ave., Houston 7, Tex.

TOUGH MOUNTAIN JOB LICKED-AT LOW COST!

The Utah Construction Company is hard at work on a power plant tunnel job high in the Sierra Nevada Mountains. The mixing plant is set up at the main concrete pour . . . but two miles away over rough construction roads, is the other end of the tunnel—and another pour.

They picked the Dumpcrete for this tough haul . . . because it is light in weight—fast and easy to handle on the rough roads. It's rugged too—keeps going day after day. It loads fast and dumps fast (right into buckets without a ramp)—four yards of specification concrete every trip. Best of all, it costs less to buy.

These same features make the Dumpcrete a time and money saver for every concrete man. Write today for complete information.

The Dumpcrete Body

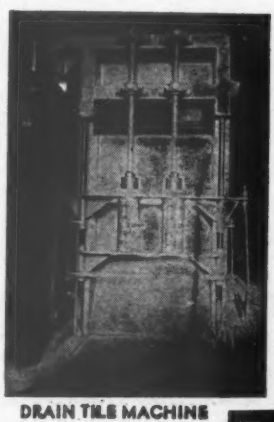
Lightweight, watertight, loads fast, dumps fast or slow, places anywhere, costs less to buy and run. Ideal for hauling aggregate, coal and earth.

• • •

*** Dumpcrete Concrete**

Is central-mix air-entrained concrete hauled and placed with the speedy, low-cost Dumpcrete. Provides top-quality, plastic, workable and non-segregating concrete, saving up to $1.00 per yard.

DUMPCRETE DIVISION
MAXON CONSTRUCTION CO., INC.
490 Talbott Bldg., Dayton 2, Ohio



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HIGH PRODUCTION—LOW INVESTMENT

The Wooten Drain Tile Machine produces 2000 to 3000 tile per 8 hour shift. It is *rugged* in construction and *simple* and *accessible* in design. Price $685.00.

Delivery 2 to 5 Weeks

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Sturdily Built In Any Size to Meet Your Production Requirements. 9 Cu. Ft. Mixer $375.

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CONSTRUCTION and MAINTENANCE TOOLS

Busting concrete, digging clay, shale and frozen ground; cutting asphalt and tamping backfill — with Gasoline Hammer Paving Breakers.

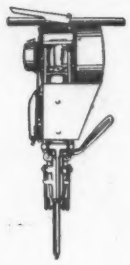
Drilling, cutting, chipping concrete and masonry; vibrating concrete forms and molds; scaling concrete, rust and old paint from equipment — with Electric Hammers.

Drilling, sanding, buffing and polishing wood and metal with Electric Drills and Sanders. Grinding welds and wire brush work with Electric Grinders.

Vibrating thin wall forms; burial vault forms, pipe forms and other precast concrete products with electromagnetic Form Vibrators. Vibrating bridge decks, floor slabs, piers, etc. with flexible shaft Mass Vibrators.

Write for literature on this TIME and COST SAVING equipment.

SYNTRON CO.
385 Carson, Homer City, Pa.



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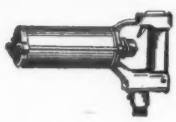
PAVING BREAKERS
100% Self Contained



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ELECTRIC HAMMERS

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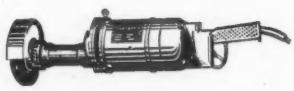

Portable Electric
GRINDERS — SANDERS

SPEED PRODUCTION — DECREASE INJURIES

Designed by specialists for safety, these thumb-type hand pads offer maximum protection and cool comfort at minimum cost. Heavy genuine horse-hide. Workers like them.

Sample pair — $1.00 — Dozen pairs — $11.40.

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A DEPENDABLE GUIDE TO SAFETY
GENERAL SCIENTIFIC EQUIPMENT COMPANY
TESTED INDUSTRIAL SAFETY PRODUCTS

2735 W Huntington St., Philadelphia 32, Pa.

Gloves • Respirators • Goggles • Shields • Aprons • Helmets

● Overhead Guard

Latest addition to the Lewis-Shepard line of attachments for power fork-trucks is the new heavy-duty canopy-type overhead guards. Constructed of

heavy tubular arc-welded steel and supported at four points on the fork-truck, this canopy-type guard affords the operator complete protection from falling objects, not only carried by the truck, but also stacked alongside the route of travel. An expanded metal screen to fit over the horizontal portion of the guard is available where required.

The new guard is detachable and is so designed that it can be quickly adapted to fit every model of Lewis-Shepard gasoline or electric powered "Standrive" fork-truck. Lewis-Shepard Products Inc., 276 Walnut St., Watertown 72, Mass.

● Mortar Spreader

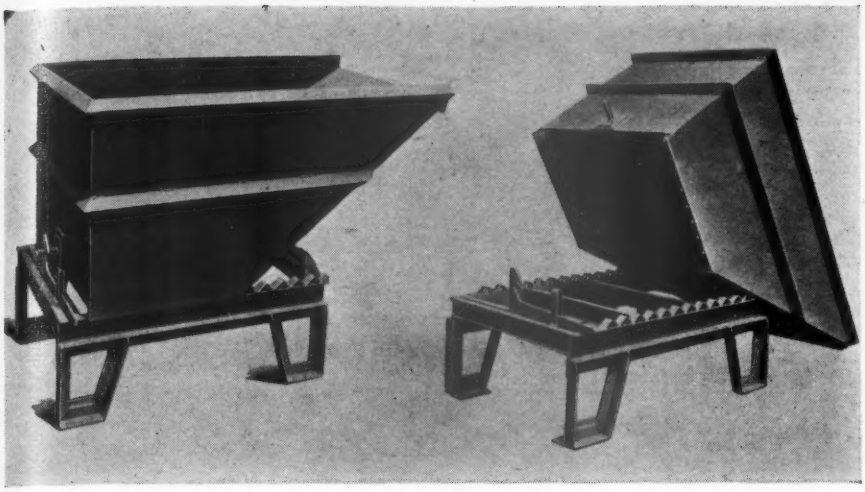
Designed to cut mortar-spreading time to the minimum, the wheel-mounted device developed by the Rapid Manufacturing Company of Grand Rapids, Mich., is said to lay mortar on five blocks in the time a man can trowel it on one. The machine runs on the wall and spreads the mortar for the next row of block.

According to the manufacturer, the spreader can be pushed with one hand nearly as fast as a worker can walk. Three cogs on the rear of the device run on the block partitions, vibrating the mortar from the hopper to the wall.

● Skidproof Floor

The Wilbur & Williams Company, Boston, Mass., have just made available for the market their "Rubber-Coat Skid-Less" enamel designed especially for heavy traffic conditions found in factories, schools, hotels, institutions and homes. The average cost to the user is less than one cent per square foot and is supplied in colors, black and white.

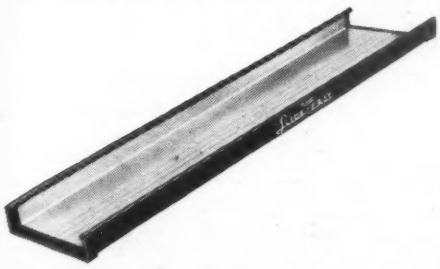
Even accidental spillages of alcohol, gasoline and most chemicals are said not to affect this material. This product is said to have the same constant resistance to washing and even submersion in water and chemicals that rubber has.



Designed by the Palmer-Shile Company, 12662 Mansfield Avenue, Detroit 27, Michigan, this truck serves well for handling and dumping sand and similar materials. It fits any fork or lift truck and can be built with rubber or metal wheels instead of legs. The dumping device is built of heavy steel plate, reinforced with heavy angles. Rockers, geared to the truck, are self-seating and smooth in operation.

● Porcelain Chutes

Now available to concrete dealers and contractors are "Slide-Fast" porcelain enameled chutes for handling concrete mix, both on trucks and on job sites.

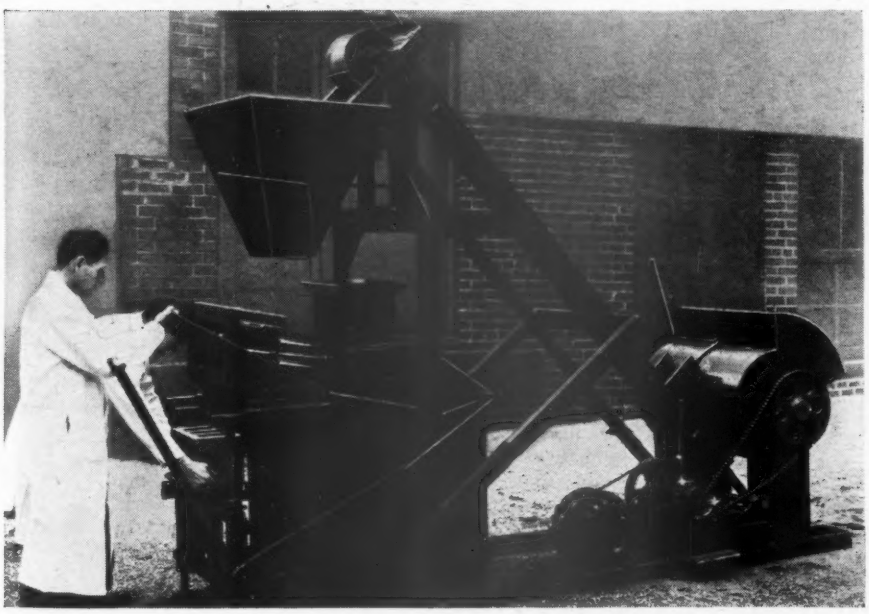


The advantages cited over plain metal chutes include greater speed, less spillage and longer chute life, according to The Erie Enameling Company, manufacturers. The smooth porcelain enameled surface is said to reduce friction and wear to the minimum and eliminate the cleaning problem. A water wash is generally sufficient to remove even partially dried concrete.

The manufacturers had refused to release the chutes for use with concrete until field tests had proven their value.

Among new business ventures in the vicinity of Holt, Mich., is the Holt-Mason Ready Mix Company. Owners of the firm are Thomas Esch, Clare Gould and Wayne Jennings.

A lightweight fiber concrete, very resistant to fire, is described in a report. Office of Technical Services, O.T.S. 1048, Commerce Department.



The Equipment Engineering Co. of St. Charles, Ill., has placed on the market a portable, concrete block-building plant, known as the "Economy Block Builder." Power is provided by a 3-hp. electric motor. Vibration is applied directly to the mold box in both the upright and inverted position.

"Marvel Automatic"
Drain Tile Machine

Makes both 4" and 6" standard drain tile. This is a production machine that is priced right. Quality of the product is not surpassed by machines costing many times the price.

A slight grip on the control arm forms and packs uniformly every tile from end-to-end—and in a matter of seconds!

No pallets required. No cogs, balances, weights, split-nuts, nor clutches to wear out!!!

The "Marvel Automatic" is heavily constructed of steel, with malleable cast iron castings.

Write for Catalog E, and add this Money Maker to your business without delay.

[Heavy cast aluminum molds for making bird baths, decorative flower pots, urns and boxes (eight designs); and love seats, may also be obtained from us . . . *Good for a lifetime.*]

The
Concrete Machinery Company
Hickory **North Carolina**

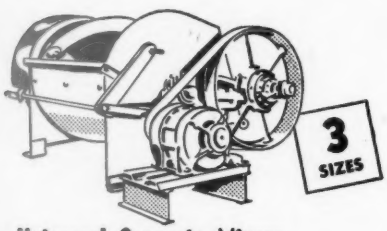
Universal

Pipe-Making Machinery is Designed for *high profit* Operation

fewer men make more pipe with

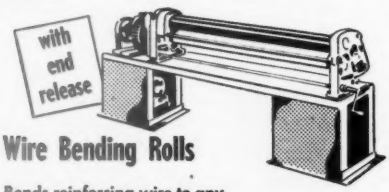
Universal Concrete Pipe Machines

Real money-makers because they make finest ASTM Specification pipe at lowest cost of operation and maintenance. Designed and built by experts with a quarter century pipe making experience. Write for full details.



Universal Concrete Mixers

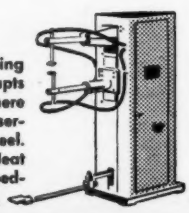
Work horses for manufacturers of concrete products. Simple, dependable over years of continuous operation. Save on first cost and upkeep. Capacities: 28, 42 and 50 cu. ft. Send for information.



Wire Bending Rolls

Bends reinforcing wire to any radius, accurately, quickly. Quick, easy removal of completed cages. Extra heavy frame and oversize bearings, with covered gears and overload safety feature.

Wire Mesh Welder



Specially designed for welding reinforcing wire (but adapts for many other uses). Best there is for steady heavy-duty service. Fully enclosed in steel. Water-cooled electrodes. Heat control switch. Swivel foot pedal leaves both hands free.

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New Equipment Boosts Output Of Block at Wyoming Plant

Recently installed equipment of the most modern type has nearly tripled the daily output of concrete block at the Sheridan Concrete and Pottery Works, Sheridan, Wyo. In addition to the increased capacity (2,000 per day) the firm has also been able to cut the selling price from $28.50 per hundred to $26.

Pete Tissino, manager and owner, stated that the addition of the new equipment was necessitated by the swelling local demand for both lightweight and standard block.

Charles Boswell New Owner Of Anna Block Company

Facilities and equipment of the Anna Block Company, Anna, Ill., were recently purchased by Charles Boswell of Chicago from the former owners, C. C. Penninger and Guy Gamber.

Mr. Boswell, who formerly made his home in this area, has engaged Jack Gore as manager of the plant. Mr. Gore previously operated his own concrete block plant at Cypress, Ill.

Central-Mix Concrete Co. Opened at Rapid City, S. D.

One of the largest concrete mixing plants in the Rapid City (S. D.) area began operation recently when the Central-Mix Concrete Company set its equipment in motion for the first time. Daily capacity of the plant is 350 cu. yds. of concrete (8 hours).

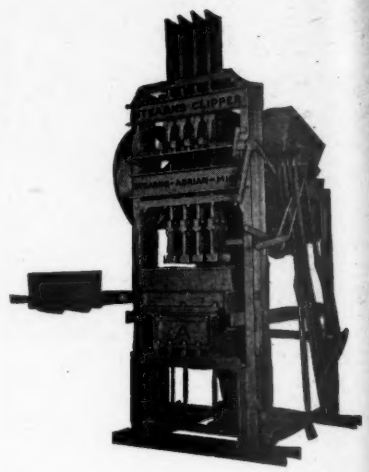
According to officials, the company will specialize in air-entrained concrete. Operation of the plant will be completely automatic. K. D. Lynn is manager.

John D. Dow recently purchased the Eureka Concrete Building Products Company at Eureka, Calif., from the former owners, Loren Weismuller and Carl H. Guettler. The plant, which has specialized in concrete blocks, is said to be one of the three largest of its type on the Pacific coast.

Trade Notes

How alert management in many branches of industry is finding new economical applications of modern materials-handling machines is clearly shown by a series of films prepared by the Industrial Truck Division of the Clark Equipment Company, manaufacturer of electric battery-powered and gas-powered fork lift trucks and towing tractors.

Both types of machines are shown at work, in operations that include many phases of modern packaging, loading and handling. The films are available on a loan basis upon request to the Industrial Truck Division, Clark Equipment Company, Battle Creek, Michigan.



The Clipper Stripper, shown above, available in 5 models, is only one of the popular machines in the ANCHOR Line of Complete Equipment for the Concrete Products Plant. ANCHOR Engineering Service in the design of new plants or revamping older operations is nationally famous. Consult us before you buy equipment or modernize your plant . . . it costs no more.

Stearns Clipper Stripper Machines; Stearns Jolterete Machines; Stearns Mixers; Cast Iron and Press Steel Pallets. Straublox Oscillating Attachments, etc. Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

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G. M. Friel, Manager Columbus, Ohio

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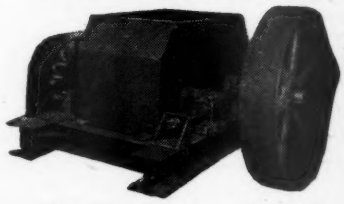

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25 to 50 ton per hour capacity **$1074**

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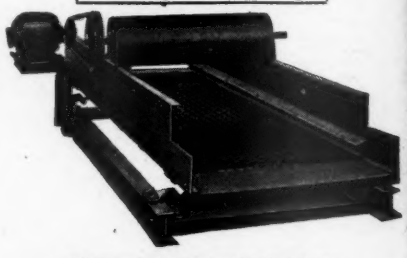

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